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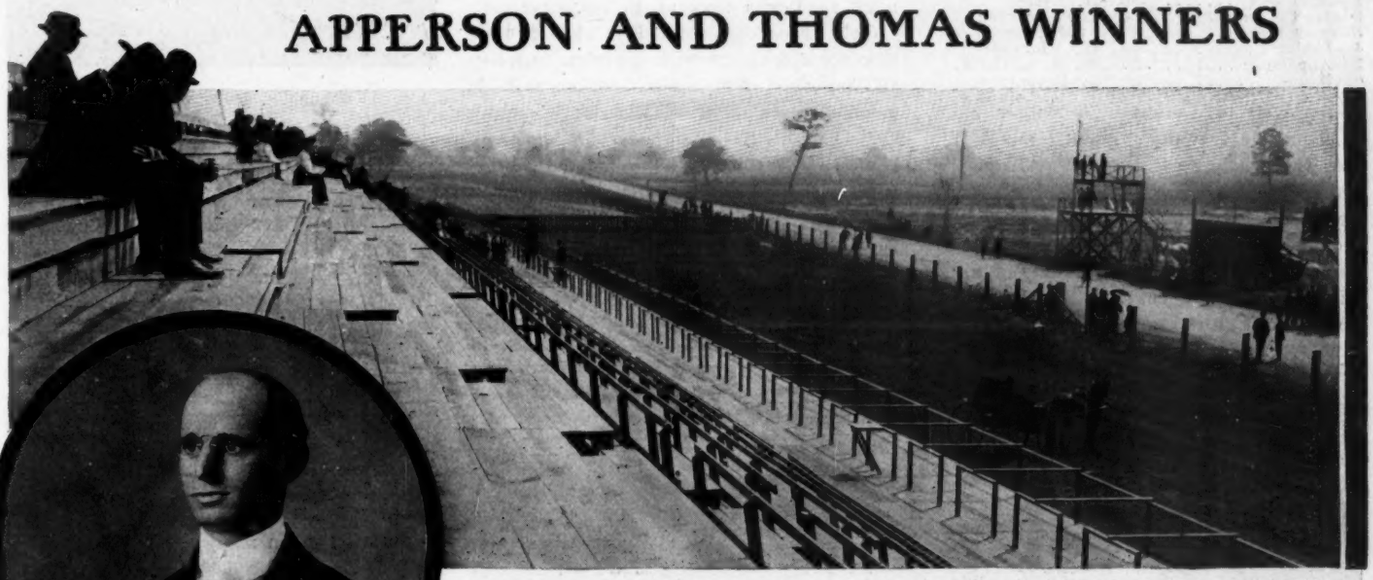
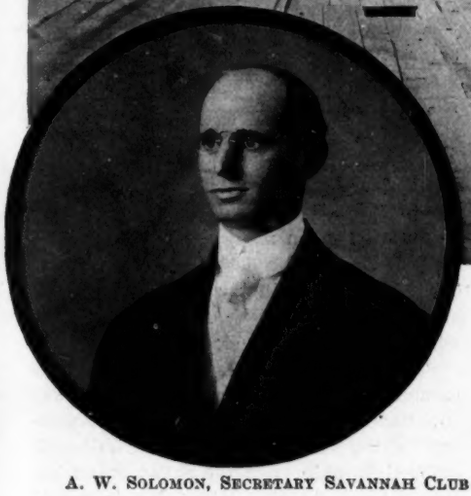
MOTOR AGE

APPERSON AND THOMAS WINNERS



VIEW OF HOME STRETCH AT SAVANNAH FROM GRAND STAND



A. W. SOLOMON, SECRETARY SAVANNAH CLUB

SOUTHERN RUNABOUT CUP, DISTANCE 180 MILES

Won by Apperson, Lytle driving. Second, Thomas-Detroit, Lorimer driving

Winner's time, 3 hours 35 minutes 41 seconds; average speed, 50 miles an hour

SOUTHERN HIGH POWER CUP, DISTANCE 180 MILES

Won by Thomas six, Salzman driving; also started, Stearns six, Leland driving

Winner's time, 3 hours 2 minutes 25 seconds; average speed, 60 miles an hour

SAVANNAH, Ga., March 18.—Special telegram—Favored by ideal weather and with the 18-mile course lightning fast, the Savannah Automobile Club today inaugurated its road carnival with great credit to itself and its helpers. The two races scheduled, the runabout event and the Southern High Power cup contest, were run without the slightest suspicion of an accident or a flaw in the management of the races. The runabout affair was won by Herbert Lytle in an Apperson, which, averaging 50 miles an hour, defeated a Thomas-Detroit, driven by Lorimer. The afternoon race, which went to Salzman in a Thomas six, which clipped off the 180 miles at a 60-mile an hour clip, was not so interesting, because its only rival was a Stearns six, driven by Leland, was put out in the second lap by a broken connecting rod just at a time when it looked as if there would be a battle royal between the two cars. An accident to the Pennsylvania in the second lap of the runabout race also spoiled a good contest, as the Pennsylvania had shown its heels to its rivals in point of time on the first circuit. The Thomas-Detroit suffered from carbureter trouble all the time.

All of the officials of the American Automobile Association are more than pleased with the course, the policing of it and the hospitality of Savannah. Not a person who had not a pass signed by Mayor George W. Tiedman, countersigned by William B. Stephens, major commanding the militia, crossed the 18-mile circut during the two races. Every turn was flagged, soldiers were stationed along the course and armed with rifles and ball amunition. Where they were not, the Savannah police maintained equally vigilant control. Today has been an object lesson in road racing in America; it has proven that troops are the only patrols for a course and that all road races can be conducted with a great factor of safety.

It can be truly said that never have the racing motorists of either continent had supplied them the equal of this 18-mile circuit as a long-distance race course. It is level. It is smooth. It has room for two cars to pass at its narrowest and for three to drive abreast at its broadest point. In the run through Thunderbolt and the Isle of Hope it presents a corkscrew of turns that will well test the skill of the best drivers. It lacks hills utterly. On its stretches it admits of the ultimate of speed and a pace of almost a mile a minute around its turns. Sustained maximum speed will go far to test engine endurance by way of atoning for the lack of strain hill-climbing would afford. The Savannahans practically have built a race course. They have made sharp turns easy by gradually rounding and elaborately banking them at places even with cement. In easing the corners they have cut ruthlessly through private property and even front yards, but with the ready acquiescence of the hospitable and sportsmanlike owners. They have rebuilt bridges so that the planks shall run longitudinally. They leveled railroad crossing. They have built bridges across the course for the transfer of trolley passengers. They have refined the entire surface of the circuit. They have established fifteen telephone stations. They have erected a grandstand with 5,000

seats and sixty-five boxes, provided fifty parking spaces for motor cars, have erected separate judges' and press stands, have shut off the home stretch by an impenetrable wire barrier, and their steamship companies have given motorists so cheap rates for the transportation of their cars that a New Yorker may take his machine to Savannah and back for $15.

The big 360-mile race for the Savannah challenge cup will be started at 5 o'clock Thursday morning. All eight candidates are here. They and their numbers are:

No.	Car	H. P.	Driver
1	Apperson	50	H. Lytle
2	Isotta Fraschini	50	Louis Strang
3	American	50	Fred Tone
4	Lozier	45	H. Michener
5	Apperson	50	W. R. McCulla
6	Isotta	50	A. Poole
7	Stearns four	30-60	F W. Leland
8	Acme six	45	M. Neustetter

Anent the drawing for numbers for this race there hangs a tale. Edgar Apperson claimed he made his entries and that they were accepted with the understanding they should be started respectively first and last. Although this was clearly against all precedent and contrary to the conditions named on the entry blanks, the other entrants consented, in view of the Apperson having made the initial entries to the meet, to one of their cars starting first, but refused flatly to permit the other to wind up the procession.

One of Temporary Bridges Used to Cross the Course

Apperson Wins Runabout Race

Herbert Lytle, driving a 24-horsepower Apperson car, won the Southern Runabout trophy on the 18-mile Savannah circuit, covering 180 miles in 215 minutes 41 seconds, an average of 50 miles per hour. His only competitor was L. B. Lorimer in a 40-horsepower Thomas-Detroit, who was a lap behind the finish and who was flagged off at the end of the ninth lap. Lorimer drove at an average of 44.8 miles per hour for the nine laps. Only three cars started, the third being a 50-horsepower Pennsylvania that dropped out in the second lap because of stripping the high-speed clutch teeth in the gearsets. This car has been the speed favorite of the race for several days, and proved its right to this by making its first and only lap in 18 minutes 54 seconds, which was 1 minute 8 seconds faster than any other lap of the race. The accident was due to the too sudden dropping in of the clutch. The car was immediately officially withdrawn. Lorimer had trouble every lap with his carbureter and the only evidence of the race on the car was a wobbling left hind wheel. Lytle did not have to change tires once on the course and made but two stops, one to refill with gasoline and oil, the other to change the magneto set of spark plugs. At the end of the race the course showed considerable wear on the banked turns and the White Bluff road was very rough in places.

Only three cars started in the 180-mile race for stock cars with a piston capacity of less than 375 cubic inches, namely, the 50-horsepower Pennsylvania, driven by L. J. Zengle; the 24-horsepower Apperson, piloted by Herbert Lytle, and the 40-horsepower Thomas-Detroit, driven by L. B. Lorimer. The first car, the Pennsylvania, got away promptly at 10 o'clock, followed by the Apperson 6 minutes later and the Thomas-Detroit 4 minutes afterward.

Not a half-hour before the start the Thomas-Detroit driven by R. J. May blew out a piston head and was scratched. The car has done good work in practices and its withdrawal was a general subject of regret. The other two cars scheduled to start, the Premier and Cleveland, did not reach Savannah in time to start.

The morning broke in true southern splendor, there being a few clouds at 6 o'clock, which faded away entirely an hour later. The wind was blowing from the south into the face of the half-filled grand stand and directly across the 4-mile homestretch. The course was perfect except the first 3 miles of the circuit along the White Bluff road, which received too much oil yesterday and is a little treacherous. The course was perfectly guarded before 8 o'clock. Captain Davant, of the Chatham corps, had his men, 300 strong, transported to the course and soon his sentries and patrols were lining the long stretches of palm-bordered course. Also early on hand was Chief of Police Austin with seventy men who were stationed at 500 feet intervals along the homestretch. The system was perfect; not a person was on the entire 18-mile circuit and the racers had nothing to do but keep their cars on the course.

Lytle, Apperson, Runabout Race Winner

Story of the Race by Laps

Lorimer's Thomas-Detroit was first at the starting line, arriving at 2 minutes after 9. Lytle's Apperson, No. 4, arrived 9 minutes later and Zengle's Pennsylvania, No. 1, arrived 9 minutes after Lytle. The story of the race is as follows:

First lap—The Pennsylvania started fast and completed the lap in 18 minutes 54 seconds, at slightly over 57 miles per hour. Lytle's Apperson made the lap in 20 minutes 27 seconds, a 53-miles-an-nour pace. The Thomas-Detroit was 23 minutes 45 seconds going the distance. It slowed up 1 mile from the grand stand but continued.

Second lap—The Pennsylvania met with an accident when 3 miles on the lap and was out, leaving the Thomas-Detroit and Apperson in the running. The Thomas-Detroit stopped ¾ mile from the grand stand but passed in good shape—time, 24 minutes 21 seconds. The Apperson leads by 7 minutes 10 seconds; pace 54 miles per hour.

Third lap—The Apperson did the lap in 20 minutes 20 seconds. The Thomas-Detroit stopped to fix a tire at the Isle of Hope and stopped for 1 minute ½ mile from the grand stand. Time of the lap, 26 minutes 5 seconds. Apperson leads at the end of the lap by 12 minutes 55 seconds. Average for three laps, 54 miles per hour.

Fourth lap—Lytle's time for this lap was 20 minutes 32 seconds. The Apperson passed the Thomas-Detroit on the back stretch, being a lap, less 4 minutes, in the lead. Lorimer finished the lap in 26 minutes 55 seconds at medium speed with the left rear wheel wabbling slightly. He passed Lytle at the Isle of Hope while the latter was refilling with oil and gasoline.

Fifth lap—Apperson refilled with gasoline and oil and finished the lap in 26 minutes 42 seconds, or 1 hour 48 minutes 50 seconds for the first half of the race, an average speed of 50 miles per hour for the 90 miles. The Thomas has had carbureter

SALZMAN, THOMAS SIX, A WINNER WEDNESDAY

troubles, having had to stop three times every lap because of this. Its time for the lap was 23 minutes 57 seconds; total time for the first five laps, 125 minutes 3 seconds, or 43 miles per hour. The burst of excitement at this part was the greatest so far in the race. Lytle led past the stand by a few lengths, Lorimer coming down the stretch and gaining very fast, passing Lytle just beyond the turn past the grand stand.

Sixth lap—Lytle started the second half of the race by doing a lap in 20 minutes 32 seconds, which was the exact time taken for his fourth lap. Lorimer came to a full stop 200 yards from the grand stand, but started a few seconds later and passed in good shape except for the left rear wheel. His time for the lap was 20 minutes 2 seconds, the fastest of the race, excepting that made by the Pennsylvania. Forgetting the lead Lytle has, the race is most interesting. Both cars are running within 100 yards of each other and passed and repassed each other no fewer than three times in one circle. Lorimer is making a game drive for his first road race, while Lytle is driving a most consistent race, averaging 54 miles per hour. The grand stand is awakening, 2,500 spectators rising and cheering on two successive laps as the cars chase each other on the stretch.

Seventh lap—Lytle gave another example of consistent driving, doing the circuit in 20 minutes 20 seconds, the same as in the third lap. With the exception of the fifth, he has had variation of 12 seconds in six laps. Lorimer finished the lap by again trailing Lytle at 200 yards distance, bringing the entire grand stand to its feet for the third successive time. Just after crossing the tape Lorimer stopped and replaced a spark plug. Lorimer's time for the lap was 24 minutes 33 seconds. Lytle leads by a lap, less 4 minutes.

Eighth lap—Lytle made a slow circuit, taking 24 minutes 4 seconds to go the lap. Lorimer, a victim of carbureter trouble, took 25 minues 9 seconds to go the distance, but passed the grand stand at good speed. Lytle's total time for the eight laps, or 144 miles, was 173 minutes 26 seconds. Lorimer's time for the same distance was 194 minutes 47 seconds.

Ninth lap—Lytle struck his old pace of approximately 54 miles per hour, doing the lap in 20 minutes 56 seconds. Lorimer did this lap in 22 minutes 11 seconds and was flagged off, bringing the race to an end as Lytle finished over a lap ahead of him. His total time of 162 miles was 216 minutes 58 seconds, or 44.8 miles per hour.

Tenth lap—Lytle made a steady drive of it, taking the Apperson around in 21 minutes 19 seconds, making its time for the 180 miles 215 minutes 41 seconds. His average time was 50 miles per hour.

Victory for the Thomas Six

Not 10 minutes elapsed after the finish of the runabout race before George Salzman, driving a 70-horsepower six-cylinder Thomas, entered by J. F. Kiser, of Atlanta, Ga., was dispatched on the 180-mile grind for the Southern cup. It was exactly 2 o'clock when Salzman got away, and 2 minutes later Frank Leland, piloting a 60-horsepower Stearns, entered by E. H. Inman, also of Atlanta, Ga., was sent off. This race was a truly southern contest because of the contestants being Georgia cars. The other three cars entered did not arrive at Savannah at all. The Thomas six won the event, covering the 180 miles in 3 hours 2 minutes and 25 seconds, or at an average of almost 60 miles per hour.

The interest in the race was lost on the second lap when Leland's Stearns broke a connecting rod on the back stretch, which put the car out of the running. The first lap gave promise of an excellent speed contest as the Thomas did it in 17 minutes 35 seconds and the Stearns in 16 minutes 55 seconds. This pace of 62 miles per hour was enough to thrill the grand stand and the roar of the bix six motors was drowned in the plaudits from the grand stand. Through the ten laps the Thomas ran a most consistent race, making the first half, or 144 miles, in 144 minutes 6 seconds, or at 60 miles per hour.

Salzman had the car under excellent control and tore down the long grand stretch at a speed of 80 to 90 miles per hour. His driving brought praise from all spectators, because of the first eighty laps four were made in 17 and a fraction seconds, one in less than 17 and one in 18 minutes flat. The time for the ten laps was: First lap, 17 minutes 35 seconds; second lap, 17 minutes 2 seconds; third lap, 16 minutes 51 seconds; fourth lap, 21 minutes 45 seconds; fifth lap, 18 minutes; sixth lap, 17 minutes 53 seconds; seventh lap, 17 minutes 37 seconds; eighth lap, 19 minutes 33 seconds; ninth lap, 19 minutes 20 seconds; tenth lap, 18 minutes 49 seconds. The fastest lap was the third, in which a speed of over 63 miles per hour was made, and this speed, considering the seventeen turns of the course and the corkscrew nature of it, amounts to a wondrous performance. It speaks volumes for the Savannah course.

Course Fast But Strenuous

Savannah, Ga., March 16—Savannah is ready, waiting, to make its debut in the motor car racing game; the last finishing touches on the preparation of the course are done, the grandstand is finished, the judges and press stands are completed; the final orders to the Georgia militia, which with the assistance of Savannah police will guard the course, have been issued; the fourteen cars that have arrived have been tuned to the minute; drivers have familiarized themselves with the seventeen turns on the 18-mile circuit; and, with the exception of the Premier, Cleveland, Matheson, Austin and Gearless cars, that have not as yet arrived, everything is ready for the signal of Starter Fred Wagner. Few in the country are aware of the speed possibilities of the Savannah course, many northerners having the scant information that within a few miles of this city is a circuit of good roads suitable for car speeding. Briefly, the facts are that the course is one of the best in the country for a road race. True, it does not come up to the continental conception of an ideal course in that it is without a hill or grade; but what it loses because of the absence of these it makes up in its unexcelled stretches and its continuous serpentine courses through the Isle of Hope district.

AL POOLE IN ISOTTA TAKING ONE OF BANKED TURNS AT SPEED

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ONE OF THE PICTURESQUE STRETCHES ON THE COURSE

It is a course that will test the driver to the full. Of its seventeen turns seven are right-angled ones which have been banked; the remainder are oblique turns that can be taken at speeds ranging from 30 to 50 miles per hour. In seven right-angled turns which the Savannah Automobile Club, in conjunction with the city and county authorities, have banked give the course a very racy effect and the cars have shown 43 miles per hour on these. What the cars can make up on these by way of speed will be lost on the Isle of Hope twists, which are double S winds, with fences and front lawns mixed in. In no fewer than two places have the enthusiastic Savannahans given over their front lawns to the racers and through them have been built banked turns to add to the speed of the course. It is a most unusual sight to see cars traveling at 45 miles per hour between a man's doorstep and his front gate, with semi-tropical flower beds on each side of the track in the way of variety.

Oiling the Road Race Circuit

The road is made of Augusta gravel with clay mixed in, which acts as a natural cement. In constructing the roadbed the gravel and clay are well watered for successive days, after which weeks are needed for a thorough drying, followed by a caking of the surface, which in 6 months makes a surface as hard as asphalt. The majority of the course is in this condition, but a few changes made since the first announcement of it compelled the building of a stretch of new road in the Thunderbolt district, which has not hardened as well as it might and which does not knit well under the oil treatment. Another tank load of oil is being sprinkled on that part of the course today, which should improve it. Another stretch not in the best of shape is along the White Bluff road. Heavy horse teaming along this highway of late wore frequent holes in the surface which have been filled with a surfacing, but, as in the Thunderbolt district, it has failed to properly cement with the oil treatment, and cars at a 70-mile-an-hour pace get a severe spring test on it. With the exception of these parts everything is in the best of shape. There is a 4-mile stretch along Dale avenue past the grand stand over which the power of the motor is the only limit to the speed. Already some drivers have been checked over this bit at an 85-mile-an-hour clip for successive miles, and the small runabouts have in a few cases shown as high as 70 miles an hour on it, which is considered a remarkable clip.

Good Job Done on Banking

The banked turns are all right; an examination of the surface made today after two hours of practice work showed them not to have given away in the slightest. In two cases, however, the road-making brigade experienced difficulties on the banked turns, the trouble being the impossibility of getting the gravel to cement. Undismayed, the Savannahans rose to the occasion and put in a pavement of cement which offers an excellent gripping for the inside wheels of the cars. This little act is but one of the many that the enthused road makers of Chatham county have done in their determination to make the course the best that could be obtained.

The banking of turns is not without its humorous side. In the Isle of Hope part of the course is one dangerous point—a picket fence juts into the course and around this the drivers must pilot their machines. The road makers interviewed the owners with the hope of getting permission to take the post down. A woman owns the property and has an invalid child. She had her price of $50 for that post, nothing more or less. So defiant has been her attitude and so persistent her clinging to the $50 mark that the committee has issued special instructions to the drivers to show particular caution in making the turn.

The committee has shown exceptional care in marking of the turns by stretching long streamers across the courses at points 200 yards before the turn. These banners read, "Left Turn" or "Right Turn" or "Snake Turn," and also shown on them is the angle of the turn. The letters are large enough to be read 300 yards away. These signs serve as an excellent safety factor to the drivers.

Speed Possibilities Are Great

What the speed possibilities of such a course are largely depends upon the nature of the day for the race, but in practice some fast work has been done. Harding, before he wrecked his Isotta Fraschini, had covered the 18 miles of the circuit in 16½ minutes and this forenoon the majority of the cars are running it regularly at 21 and 22 minutes.

Some features are noted that are new, namely the stopping of the trolley cars over the course. A trolley line angles the circuit and where it crosses bridges have been built just over the rails so the cars escape any possible jar. Every day when practice starts these bridges are policed and the trolley cars must stop when the course is reached and unload their passengers who cross the course on elevated bridges and transfer to a waiting car at the other side. On the day of the race every road will be blocked from 7 in the morning until 7 in the evening; military patrols will be stationed at every crossroad and every turn and orders have been issued by the colonel in charge that not even press representatives or photographers will be permitted on or to cross the course. It is whispered that the military orders also include an issue of ten rounds of ball ammunition to each soldier, coupled with instructions to shoot any animal seen approaching or likely to get on the course. With these and the many other precautions there is not any reason why the outcome of the event should not be stamped with the trade mark of success.

In building the grand stand a commendable precaution is that of placing it back 100 feet from the course, leaving a lawn of that width in front of the first row of boxes. Another excellent feature is that the end at which the cars approach is further from the course than the end the cars leave from, thereby giving the spectators in the entire length of the stand a view of the cars for 2 miles or more be-

LELAND, STEARNS

fore they pass the stand. After the stand is passed the cars must shut down to take a banked right angle turn onto the White Bluff road. Once on this road the spectators can trace their progress for another 2 miles. Further, the back stretch is not so far away but that the hum of the motors can be distinctly heard for long stretches on it. The grand stand will accommodate 5,000, 1,800 of which are $2.50 seats covering admission for 2 days; the remaining 3,200 seats sell at $2 each, which covers both days. In addition to this are sixty-five private boxes, all of which have been sold to Savannah people at $35 each. The receipts from this source, coupled with the entry fees and sale privileges, will bring the total revenue up to $17,000. For half a mile at each side of the grand stand wire fences have been built well back from the course and on the opposite side of the course from the grand stand nobody will be allowed.

Technical Board Examines Cars

Chairman N. H. Van Sicklen, of the technical committee, and his aides were busy all day Sunday inspecting the many competing cars and checking over the various measurements of them to insure that nothing but stock constructions were allowed. In this little trouble was met with, the majority of the cars carrying every earmark of the stock machine. Not a little care was taken on the two Isotta Fraschinis that have every line of a racing machine. However, the catalogs from Italy show them to be of stock lines, the company having brought out a special line of fast roadster cars. These machines are fast and are favorites with many in Savannah. The cars carry huge cylindrical gasoline tanks with almost a 50-gallon capacity and also have oil tanks the whole width of the car and with capacity of 7 gallons. These are valuable assets to a machine on a 30-mile race and it seems a little unfair that other cars are not allowed to carry more than their 18 or 20-gallon supply in a tank under the front seat. The Isotta pistons were taken out and measured as were those on some other cars, but not on all of them, as it is the understanding that the winning machines will have to take off their pistons and have the bore and stroke as well as the valve diameter measured. The Isotta pistons are perforated to reduce weight and the connecting rods are made hollow. The six-cylinder Thomas was compelled to take off a 29-gallon cylindrical gasoline tank that was mounted crosswise behind the seat and to use instead the regulation tank under the seat. The Lozier was ordered to use but one of its 5-gallon oil tanks carried lengthwise on the chassis. One of the Thomas-Detroit machines had its springs wrapped, which wrapping was removed, but otherwise nothing out of the regular was met with. It is most commendable to think that the makers have taken stock jobs off the shipping room floor and have not tried to win a victory by unfair means, and this has excited favorable comment on all sides.

MICHENER, LOZIER

HOME STRETCH AND STAND FOR THE TIMERS

Three Cars Are Missing

In the race for cars with a piston displacement of over 575 cubic inches the probable starters are the Thomas and Stearns, the Austin, Matheson and Gearless not having arrived. The Thomas will start first, and Leland with the Stearns six will follow a minute later. Both of these cars are speedy and the result of their meeting is awaited with great interest. Both of these are southern entries from Atlanta and this alone has aroused unlimited enthusiasm. The long wheelbase on each goes a little against them on the turns.

In the light runabout class, those with piston displacement of less than 375 cubic inches, excellent sport is looked for. In this are the Thomas-Detroit roadsters, colored blue and designated the Blue Birds; a Pennsylvania, an Apperson, a Premier and a Cleveland, the last named not yet having arrived but being reported on the road. Of this group the Pennsylvania is very fast, having been credited with being timed at as high as a 72-mile gait on the grand stand stretch. This motor has valves in the cylinder heads and carries the transmission on the rear axle. Both of the Thomas Blue Birds are speedy and will be factors to be reckoned with providing the drivers keep the machines on the road. The small Apperson was not on the course today, the motor being dissembled to fit on a few new piston rings, due to some breaking by working the car too hard on the course before the motor was well worn in.

In the 360-mile race the eight starters are all on hand and are doing daily work on the course. In sizing them up by a few brushes this forenoon a vague line could be had on some of them. The Isottas are fast; the Acme did fine work on the stretches, but is a little handicapped on the turns because of its 125-inch wheelbase. The Apperson Jackrabbits were not out, neither was the Stearns nor the American. The Lozier runs well, is a finely-balanced car and holds the road and turns beautifully. This should prove the best race ever run in this country as far as competition is concerned, for in it are eight well-matched machines, each one of which is capable of bringing a full grand stand to its feet by its bursts of speed. This is the big card of the event; next of interest is the runabout class, and lastly the six-cylinder field with but a couple of prospects.

In checking over all these cars the technical committee took the measure of the wheelbase, wheels, tires, cylinders, radiators, brakes, frame and springs, and inspected the carburation, ignition, lubrication, cooling and other parts. Calipers and straight edges were in constant use. The examination of some of the cars was simplified because of them being partly dissembled to be overhauled. Most of yesterday a force of mechanics was at work on the different ones, doing a little cleaning, or adding fresh grease or lubricants. Shock absorbers are fitted to all of the machines, these being particularly necessary owing to the rough condition of the White Bluff road. None of the cars has added special racing body work, although the rules allow them to do so, the makers apparently wanting to run their cars as they are sold from the factory.

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MAXWELL WINNER IN MILWAUKEE'S TEST

MILWAUKEE, WIS., March 17—Special telegram — The four-cylinder Maxwell touring car won the 3-day reliability contest, conducted by the Milwaukee Automobile Trades Association on March 10, 11 and 12. The Jackson entry, a two-cylinder runabout, ranks second, and the two-cylinder Reo third. The report of the contest committee, just issued, follows:

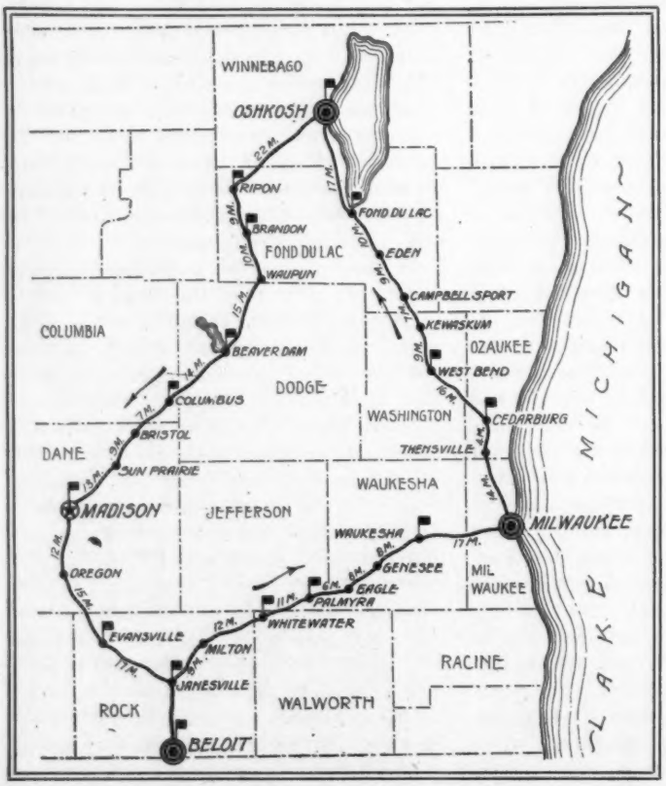
Name of car	Class	Points penalized
Maxwell touring car, four-cylinder	C	935
Jackson runabout, two-cylinder	C	965
Reo touring car, two-cylinder	C	1,085
White steamer, seven-passenger	A	1,750
Cleveland roadster	A	2,680
Thomas Forty	B	4,823
Rambler roadster, four-cylinder	B	*
Rambler touring car, two-cylinder	C	*

* No official record.

The technical committee will report soon. Nearly all the cars had clean scores the first day, but last Wednesday the trouble started. The Maxwell's penalizations were mostly for taking on gasoline and oil, 200 of the points being for breaking seals for this purpose. All this occurred the second day, as did the penalization for work. Two debits are found in this column, one for an adjustment of a spring which kept two men busy and the other for repairing a spring, which required the services of four men. The Jackson was penalized each of the 3 days. It broke seals on the transmission and on the hood, cleaned a spark plug and was charged with work on strut rods, for changing spark plugs, oiling clutch, repairing ignition system and tightening the chain drive. Only once was it penalized for taking on gasoline.

The Reo took on gas three times, water twice and oil once. It broke seals on the radiator, tank, oiler, transmission and one grease cup and the nature of the work done included bearing adjustments, adjusting a grease cup and oiling the transmission. Water penalizations caught the White most, although 90 points were charged for taking on gasoline three times. Oil was taken on once. Work done consisted of adjustments on wheel, fan belt and pump chain, while 40 points were debited for work on the engine. For work done on a hub 350 points were charged, it requiring 1 hour 10 minutes to do this.

MAXWELL TOURING CAR, WINNER OF MILWAUKEE 3-DAY RELIABILITY TEST



ROUTE FOLLOWED IN WISCONSIN RUN

H. K. Sheridan, who drove the White steamer in the reliability and who went through the last Glidden tour with a perfect score, and Ted Collier, who drove the Rambler roadster in the Chicago endurance test, declare the Wisconsin event was the most severe test on stock cars that has ever been held in the United States. Their opinion is backed by the report of the contest committee. The reliability is declared to surpass even the New York-Paris race, inasmuch as specially-built cars are making the trip around the world. The conditions of the cars, despite the hardships encountered, was remarkable, as the technical committee will report.

The contest committee takes cognizance of the remarkable performance of the Logan light delivery truck, which carried tires, oil and all supplies. The car finished in excellent time and showed little effects from the grind. Special mention is also made of the Rambler entries, which failed to finish within the required limit. The four-cylinder roadster especially is commended. After finishing the hardest part of the run with a perfect score, while the other entries had marks against them, the roadster broke a driving pinion, a most unusual accident. The part has to be secured from the factory in Kenosha, but the car reached Milwaukee 22 hours late. The only seal broken was on the transmission.

It is explained by the committee that the seemingly heavy penalties were due to the fact that there were double penalizations, one for the breaking of seal and the other for the time spent in repairs or taking on oil, gasoline and water.

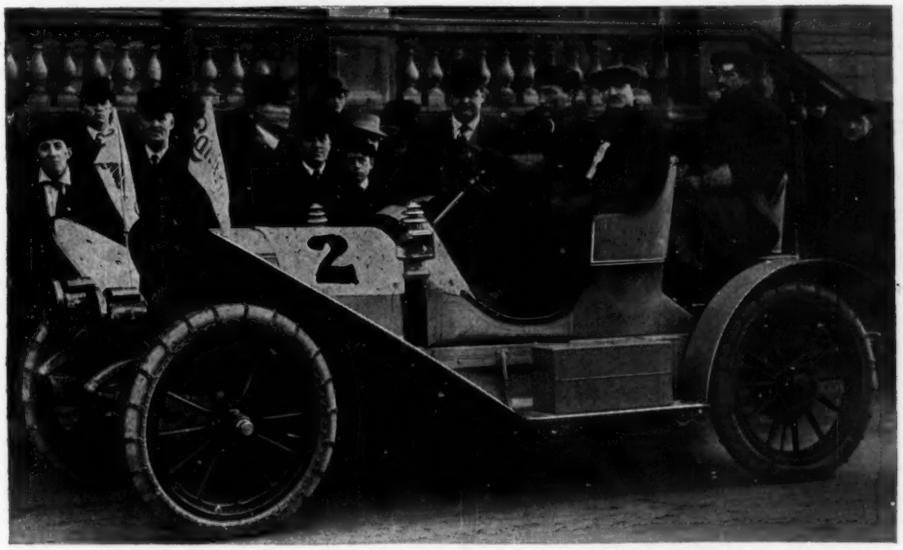
The route of the contest was from Milwaukee to Oshkosh on the first day; from Oshkosh to Beloit the second day, and back to Milwaukee on the third. The distance was 345 miles. The route as laid out was 330 miles long, but the pilot got off the road on the second day and the cars made a detour of 15 miles.

The success of the run has created interest in motoring not only in Milwaukee, but all over the state. The crowds that watched the contest were big at every point, and the result, it is expected, will be the sale of many more cars in this state than usual this spring and summer.

"It was the hardest trip I ever have made," said Ed F. Sanger, who drove the winning Maxwell over the entire course. "The run undoubtedly was the hardest that has ever been held for stock cars."

The Maxwell was the only car to go through the run without breaking a fixed seal. Its only misfortune was the breaking of a spring, and only for the time penalization its score would have been very low, possibly perfect.

Out of the 300-odd miles, the Maxwell led the procession and broke the road for more than 200 miles. It made the run to Oshkosh, a distance of 86 miles from Milwaukee, in 5 hours 10 minutes, being the first car to reach Oshkosh. The second leg of the race, Oshkosh to Beloit, 171 miles, was made in 16 hours and the Maxwell was the third to check in at Beloit. The 91-mile journey back to Milwaukee was made in 6 hours, and the car finished second. Of the four-cylinder cars, the Maxwell was the only one that did not take on water between controls. The car weighed 2,515 pounds at the start, and on the return it carried more than 50 pounds of mud.



RAMBLER ROADSTER WHICH HAD HARD LUCK IN MILWAUKEE RUN

Returning Thursday afternoon, the Maxwell was used for demonstrating the next morning. There was no adjustment of the machinery necessary, for it returned in perfect condition, it is declared. The car has been running as good, or even better, since the tour as before, and it is being used hard every day.

The Warner Instrument Co. entertained the tourists at Beloit on the second night out, but because of the fact that the cars came into that city at long intervals the feed was of a White House standing lunch sort. The drivers, mechanics, observers and other occupants of the contesting cars came in to the banquet hall in relays. There was plenty of entertainment for the motorists at Oshkosh, the first night's stop, also. The members of the Oshkosh branch of the Wisconsin Automobile Association held open house, and there was nothing too good for the Milwaukeeans.

Already plans are being made for another run. This will be held later in the year, no doubt in early summer, when road conditions are much better.

DOCTOR WINS A RACE

Stinson in Cadillac Is the Only Contestant To Finish in the Jacksonville-Miami Test

Miami, Fla., March 14.—Of the four starters in the race from Jacksonville, promoted by W. J. Morgan, there were but two survivors at the finish. The winner, Dr. W. M. Stinson, of Jacksonville, who drove a 10-horsepower Cadillac runabout, was the only contestant to finish the 372-mile journey laid out by the Cleveland pathfinder in the 5 days called for by the conditions. A 24-horsepower Peerless of 1905 model, which was chartered by Morgan for the newspaper men and was driven by C. S. Wheeler, got here at 4:30 o'clock this morning and was given second prize. Claude Nolan's 10-horsepower Cadillac runabout was put out of the race for good yesterday, 20 miles from here, by a broken axle. Dr. J. H. Pittman, who drove a 22-horsepower Buick runabout, gave up the contest at St. Augustine. The winner was the only car to emerge from the contest without a serious mishap to delay it. It made the 84.6-mile run in 8 hours 25 minutes, the 74.8 mile run to Rock Ledge in 7 hours 28 minutes, the 75.4-mile run to Fort Pierce in 7 hours and 30 minutes, the 67.6-mile run to Palm Beach in 10 hours 35 minutes and the 69.8-mile run to Miami in about 4 hours. The Peerless made the 124-mile run from St. Augustine to Rock Ledge in 8 hours 50 minutes—a record for Florida. It was bogged in the forest near Jupiter for 16 hours and broke a connecting rod between Palm Beach and Miami. Nolan's car broke its axle in a race with Dr. Stinson, lay over for 2 days at Ormond and drove 2 days and nights and caught the Peerless.

MAP SHOWING JACKSONVILLE-MIAMI ROUTE

BOSTON MAKES MONEY

Boston, Mass., March 14.—The show that ended here tonight was the most successful ever held in New England. The attendance for the week went up to about 125,000. On the opening night there were 32,000 people at the show and the hall was crowded on other nights. On Wednesday, when the price of admission was doubled, there were as many people at the show as on any of the nights during the rest of the week. Sales were reported as quite plentiful. W. M. Jenkins, of the Mitchell, for instance, closed up fifty-two orders for cars. S. M. Baker sold seven Fiats, most of them large cars. J. W. Maguire disposed of a number of Pierce-Arrows to people he had not even been in touch with during the show. On Thursday two new cars were put in that had never been at any show, having just been finished. One of these is a Viking, made in Cambridge, Mass. It is a four-cylinder 40-horsepower car, made in touring or runabout model. The other is the Crown motor buggy.

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NO ONE CLUB CAN CONTROL IN THIS COUNTRY

OBSESSED by a name which has become misleading, vainly trying to have the club what it is not and never can be, a few now in control of the Automobile Club of America, finally disgruntled because its spokesman could not dictate the policy in legislation and other matters of the New York State Automobile Association, have seen fit to resign from that organization, which high-handed action also carries with it the severance of all relations with the American Automobile Association. Recognizing the patent fact that only through local, state and national action can there be secured those things which add to the progress and enjoyment of motoring, the growth of the American Automobile Association under the existing administration has been substantially cumulative. In union there is strength, but if the clubs of a state worked as separate units, and, inevitably, often at cross purposes, there would be little accomplished and results accomplished would be few and far between.

In France the Automobile Club of France, with headquarters in Paris, does "lord" it over the clubs of the provinces, and in Great Britain the Royal Automobile Club, located in London, is attempting to do the same thing, after a break with the Motor Union of Great Britain and Ireland, with indications that its plans will go decidedly amiss; in fact, negotiations are in progress for a readjustment of differences. But foreign procedure is seldom successfully transplanted to these democratic United States, and this was quickly demonstrated at Chicago in March, 1902, when the clubs there assembled—the Chicago Automobile Club, Automobile Club of New Jersey, Long Island Automobile Club, Rhode Island Automobile Club, Automobile Club of Philadelphia, Princeton University Automobile Club, Automobile Club of Utica and the Grand Rapids Automobile Club—emphatically declined to accept the A. C. A., of New York city, as the fountainhead of government, although the Automobile Club of America was represented at the meeting. At that time A. R. Shattuck was the president of the A. C. A. Annually he visited Europe, and, perhaps, brought back motoring ideas he thought deserved transplanting. But the American Automobile Association was born at Chicago with all clubs on an equality—each club casting its total membership vote and no more. In its early years the A. A. A. progressed spasmodically, always subjected to the scrutiny of those who would not have it interfere with the ultimate hope of A. C. A. supremacy. Several administrations of A. A. A. affairs gave little except unfulfilled promises and some discussions that threatened the very existence of the organization.

Then came the Hotchkiss era and a leader surcharged with determination and enthusiasm. He took up the work the others had thrown down. Previously he raised the New York State Automobile Association to a high degree of perfection—accomplishing it without any considerable aid from the inner circle of the A. C. A., for, let it be kept in mind, the members under a constitution which has been gradually "perfected" are not required to bother much with the conduct of the club. The self-perpetuating governors do that with an expertness which has earned the admiration of experienced politicians. Still nursing that deferred desire to "nationalize," the strongly intrenched clique of the A. C. A. has watched with unfeigned jealousy the growth of the A. A. A. into a national organization of dignity and far-spreading influence. An effort was made to get control of the Vanderbilt cup, but its frank and fair-minded donor let it be understood without hesitation where he stood on that proposition. To this event—established mainly through the energy of the indefatigable Pardington—the A. A. A. owes much, for the race's 1905 and 1906 surplus furnished the financial sinews for carrying on the work of education and organization—a better use for the money than investing it in a big clubhouse in New York city.

It is well remembered by New York state motorists how they were nearly forced several years ago to accept a most obnoxious law, how Mr. Shattuck was "thanked" for his services at Albany, and then another committee undid what had been almost done. Once more we find Mr. Shattuck "legislating" at Albany, and now, despite the action of the state association of which his club had been a member, we find this industrious motor patriot insisting that larger fees should be paid than those contained in the bill of the state association. Of course, President Quayle resented this meddling, whereupon there followed the resignation of the A. C. A., thus indicating that that club is Shattuckian-governed and consequently useless except as a means of employing the time of that self-absorbed toiler, who at least deserves the credit of being honest in his misdirected endeavors.

But the A. A. A. will go on with its work, for it is founded in the needs of the hour. The A. C. A. may be rescued from ring rule, for many members are at variance with the present suicidal policy. Time alone will tell the story.

PRAISE IS DUE PROMOTERS AT SAVANNAH

SAVANNAHANS can well be proud of the success of the first day's racing. Soldiers and policemen guarded the course and not a person was allowed on it without a pass and those were few. No one was injured or even scared; the two races were run off on time and without a hitch, and while it is to be regretted the fields were small, yet the Georgians can rest assured they have taught the entire country a lesson in race-promotion. Savannah bids fair to inaugurate in the south a new era in the vogue of the motor car. The motorists of the north and the motorists of the west have lent their brethren of the south a helping hand in the inaugural of a form of motor car speed competition that will give to a manufacturer his best chance for the demonstration of speed qualities of his normal product and to the public a most convincing exploitation of the various makes of stock cars are entered in the events.

For the promotion of the race and the truly masterly attention to the details of preparation and the unstinted liberality in providing an unequaled course for racing and everything for the convenience and safety of both contestants and spectators, practically undivided credit is due the members of the Savannah Automobile Club and of the citizens' committee of the Georgia capital.

The motoring Savannahans believed they had a fit course, were willing to spend the money to promote the race, and, best of all, were able to guarantee the military and police protection demanded by the racing board as the sine qua non of its co-operation in the promotion of a really national competition. The A. A. A. and the S. A. C. wanted a race and they have succeeded.

Again let credit be given to the Savannahans. They have proven themselves true sportsmen. They have not been out for the almighty dollar. Their first thought has been the success of the race. They have spent their money like true southern thoroughbreds and—"Damn the expense, sah!"

CINCINNATI'S mayor is opposed to women driving motor cars and wants the aldermen to pass a law which will prevent the gentler sex handling the wheel. If his honor would consult the chief executive of Indianapolis he might change his mind, for a woman driver helped a Hoosier cop the other day. Patrolman Al Ray, who guards the corner of Pennsylvania and Ohio streets in Indianapolis, started in pursuit of a cab, the occupants and driver of which were drunk. The horses were being driven in a gallop. Ray climbed into an electric, told the driver to pursue the cab, but found the electric did not have speed enough. An instant later Ray surprised two young women in a touring car by climbing into the rig and telling them to run down the cab. The touring car won and the three men were arrested after a pursuit of several squares. Now the women are "solid" with the city administration of Indianapolis.

AN OBJECT LESSON was furnished last week at Washington, D. C., when motoring notables assembled at the call of the American Automobile Association to talk over with the congressional judiciary committee the features of the Cocks bill which is designed to provide a uniform federal registration law. This aggregation of bright minds did much when it apparently convinced the congressmen that the meaning of the word "commerce" could be construed to include motor cars, the doubt being as to whether or not congress could in any way regulate the use of a pleasure vehicle when operated on the highways of a state other than the state of the owner's residence. Happily, this doubt, to a large extent, has been removed from the minds of the judiciary committee and the belief is expressed that the Cocks bill will pass. Motorists, however, should not overlook the fact that the victory is only half won and that the surest way to win is to keep on fighting, the best weapon being the pen. The method to be pursued should be writing to the various congressmen asking them to vote for the bill when it comes up before the house.

WINTER is passing and there is not much time left for motoring stunts of an extraordinary character such as have marked the last few months; but the American trade can prepare for a busy summer with the satisfaction of knowing that no opportunity has been wasted to bring to the attention of the public the possibilities of the motor car. Outside of the rather humiliating experiences of the New York-Paris race, when all the contestants were forced at one time or another to employ equine horsepower to extricate them from snow drifts, there is nothing of which to be ashamed. It has been demonstrated that the motor can wriggle through the mud and make light of an ordinary snow storm. Winter now is not much different from summer and a Chicago-New York trip in February is getting almost commonplace. A few more feats like that of the Oldsmobile Mud Lark running from New York to New Orleans; the White steamer's invasion of southern territory; the great run of the Studebaker war car, and the stunts of the Gearless and Mora, which aided materially in the progress of the world's racers, and there will be few skeptics left.

WHILE this country is engrossed in such interesting motoring propositions as the Savannah meet, the New York-Paris race, the resignation of the A. C. A. from the A. A. A., and the various winter stunts, that cheery individual, Charles J. Glidden, is calmly rolling along in his globe-girdling act, utterly oblivious of what is going on in this country. Glidden's latest is to gain fame as being the first to drive a motor car into Jerusalem, and that it is a feat out of the ordinary is shown by the fact that it was deemed worthy of cabling the news to this country. It is indeed a chilly day when Glidden does not get in the limelight.

CREDIT is due the Cadillac as a champion of America and the trade in general should rejoice over the successful completion of the so-called standardization test in England in which the Detroit-made car braved much in order to prove American principles are right. Risking much, the Cadillac people put their cars to a test which opened the eyes of all Europe. Allowing the Royal Automobile Club to pick three single-cylinder 10-horsepower cars from stock, these machines were taken down and the various parts mixed. Then workmen, under official supervision, reassembled the cars from these piles of parts, thus proving the standardization principle. To make the victory all the greater, the three cars then were sent 500 miles each on Brooklands track to prove that each part fitted. Now the makers wish to send one of the three cars through the international reliability trial which is being promoted by the Royal Automobile Club. After such an object lesson it is not to be wondered that an English correspondent should declare: "All Europe doubted, but it doubts no longer. The reliability of the standardization principle has been indisputably established. In a short time there will be nothing left of the tradition in Europe that the Americans cannot make motor cars comparable with those made over here." Such frank praise from the enemy's country is well worthy of appreciation by the American tradesmen, who surely must recognize it as a distinct step forward.

The Week in Brief

Small fields compete in Wednesday's racing at Savannah, Apperson winning runabout event and Thomas six the Southern High Power cup; conditions ideal for contests and winning cars make fast time.

Milwaukee's 3-day reliability test is captured by Maxwell four-cylinder touring car; all contestants are heavily penalized because of wretched condition of the roads; six cars finish.

Automobile Club of American resigns from American Automobile Association, resignation being presented at meeting of New York state association at Buffalo.

Thomas still leads New York-Paris racers, now being on last stage of journey to San Francisco; tail-enders still struggling through Iowa.

Motorists feel they made deep impression on congressional judiciary committee at hearing of federal registration bill last week.

H. B. Joy and M. J. Budlong, of Packard company, visit Columbia plant at Hartford and old rumor is revived.

Jacksonville-Miami race is captured by Dr. Stinson in Cadillac runabout, only one of contending cars to finish.

Both Boston and Buffalo shows prove great successes; Rochester on circuit this week.

Coming Motor Events

Canadian Shows—National motor car and sportsmen's exhibition in Toronto, March 21-28; third annual show in Montreal, April 4-11. R. M. Jaffray, Toronto.

Pittsburg Show—Automobile Dealers' Association of Pittsburg show. Duquesne garden, April 4 to 11.

Denver Show—Three-day show in Denver, April 6, 7 and 8; G. A. Wahlgreen.

Westchester Road Race—Stock car chassis road race in Westchester county, New York, for Briarcliff cup, April 24.

Targa Florio—Third annual Sicilian road race, May 10.

Chicago Hill-Climb—Chicago Motor Club's third annual hill-climb, May 15.

Chicago Reliability Contest—Twelve hundred mile 4-day contest Chicago Motor Club, June 24, 25, 26, 27.

Grand Prix—Third annual French grand prix, July 7 and 8.

Glidden Tour—Start of annual A. A. A. tour from Buffalo Wednesday, July 8; good roads convention preceding it July 6 and 7.

Chicago Economy Test—Third annual economy test of Chicago Motor Club, August 14.

STRONG PLEA FOR FEDERAL LAW

Charles Thaddeus Terry Convinces Congressional Judiciary Committee Cocks' Bill Suits Needs of Motoring—Doubt As To the Definition of "Commerce"

Washington, D. C., March 16—Legislative hearings often mean nothing; their purpose frequently is to deceive rather than to enlighten. The session on Thursday last before the judiciary committee of the house of representatives with the federal registration bill of the A. A. A. as the topic of discussion was an exceptional hearing, according to the opinion of experienced observers, and the masterly presentation of argument in behalf of the measure was undeniably brilliant, logical and grudgingly convincing to lawyers sharpened by contact with all manner of constitutional problems. Charles Thaddeus Terry, chairman of the A. A. A. legislative board, counsel of the National Association of Automobile Manufacturers and professor of law at Columbia university, was the man who bore the burden, concisely putting forth the claims of the proposed law, accepting with evident enjoyment the repeated assaults that came to him across the committee table, and never losing his equanimity even when the questions were plainly intended to destroy the continuity of his really wonderful marshaling of the facts in the case. Chairman Jenkins, of Wisconsin, is understood to be a stickler in conforming to the constitution, and at times it seemed to the motorists he was searching more for material to sustain his own deductions rather than to learn on what grounds the motorists sought the right to go anywhere in this country after informing the federal government that they had complied with the laws of their own states and thus obtain a national passport.

The hearing was opened by President Hotchkiss, who briefly pointed out the necessity for interference on the part of the federal government to protect the motorists of the nation while operating in those states which require the registration of non-residents and use the requirement as a means to taxation.

The principal argument was made by Chairman Terry. It was practically conceded by the committee that legislation of the kind asked for was necessary, and that it should be accorded if congress had power under the federal constitution to regulate the registration of motor vehicles when operated in states other than those of their owners' residences. It was apparent at the outset that, the question being an entirely new one and the powers of congress being necessarily limited to its control over commerce between the states as granted to it by the constitution, and as construed by the commerce decisions of the supreme court, the problem to be solved was whether congress could in any way regulate the use of a pleasure vehicle when operated on the highways of a state other than the state of the owner's residence; in other words, when engaged in interstate travel. It was apparent, also, that most of the members of the committee had grave doubts as to such travel being within the meaning of the word "commerce" in the constitution. Hence, when it is stated that after a 2 hours' presentation by Mr. Terry, several members of the committee stated, while they had been very doubtful, they had been either wholly or almost convinced congress had the power to pass the Cocks bill, the high merit of Mr. Terry's presentation will be appreciated.

In substance his argument was that though the word "commerce" originally connected an interchange of commodities from state to state, the supreme court had from decade to decade widened the meaning of the word until it now included not merely trade but transportation, the interchange of telegraph messages, the carrying of lottery tickets on the person of a mere traveler, travel itself; in fact, intercourse between the states in the broadest possible sense of that word. It can be stated with some confidence that as to this the committee seemed to agree with Mr. Terry. In other words, he demonstrated to the committee that congress had power to legislate concerning the registration of the newest means of intercourse, or intercommunication, between the states.

Mr. Terry also called attention to a line of decisions by the supreme court, which held that under the commerce clause of the constitution the federal government had power to pass laws which would prevent one state from exacting license fees, tolls or taxes either from vessels or from their pilots or masters when plying navigable waters entirely within a state other than the state where the vessel was enrolled; and called attention to the fact that there was in principle no difference between the natural highways of a state or nation, that is the waterways and the dirt highways, and also that there was no difference in principle between a vessel navigating such natural highways and a wheeled vehicle using such artificial highways. Asked by Congressman Malby, of the committee, whether there was not a distinction between vessels engaged in interstate trade and purely pleasure vessels, Mr. Terry called attention to the case of the yacht Yosemite, in which the supreme court held there was no such distinction and that a vessel operated between ports of different states and purely a pleasure yacht was properly subject to a law preventing exactions by states other than that of its enrollment, and that this statute rested solely on the commerce clause of the constitution.

While the chairman of the committee and several of its members repeatedly asked questions which indicated they had grave doubts as to the constitutionality of the bill, Mr. Terry's argument made a deep impression and entirely convinced several of the committee. It is not likely final action will be taken on the bill for some weeks, owing to other matters pressing on the attention of the judiciary committee, but it is confidently expected by Mr. Terry and his associates that such action will ultimately be favorable to the bill Mr. Cocks has introduced.

Interviews with members of congress not on the judiciary committee led to the conclusion that should the bill be favorably considered by such committee, the bill will pass without substantial amendment or opposition. It is hoped that members of the American Automobile Association will continue to express their interest in the bill to their representatives at Washington, particularly those on the judiciary committee.

It was a substantial representation that President W. H. Hotchkiss assembled at the capitol, and they came from a dozen state bodies of the national organization. This president has proven the salvation of the A. A. A., which in the past has been led by men who have not had the time or the enthusiasm to do the big work properly. And right here let it be said that Secretary Elliott has been a conscientious factor in carrying out the plans of the president. The delegation present included the following:

William H. Hotchkiss, president American Automobile Association; Charles Thaddeus Terry, chairman legislative board, New York; Frederick H. Elliott, secretary American Automobile Association; Russell A. Field, Long Island Automobile Club, Brooklyn; A. G. Batchelder, New York State Automobile Association; C. H. Benedict, Automobile Club of Schenectady; Robert P. Hooper, Automobile Club of Germantown and Philadelphia; Paul C. Wolff, Pennsylvania Motor Federation and Automobile Club of Pittsburg; Jacob D. Rider, Lancaster Automobile Club; G. Douglass Bartlett, Quaker City Motor Club, Philadelphia; W. C. Crosby, New Jersey Automobile and Motor Club and Associated Automobile Clubs of New Jersey; R. A. Green, New Jersey Automobile Trade Association, Newark; J. H. Edwards, Automobile Club of Hudson County, Jersey City; William H. Hunt, Automobile Club of Hudson County; Walter S. Schutz, Connecticut State Automobile Association, Hartford; F. T. Staples, vice-president Connecticut State Automobile Asosciation, Bridgeport; Robert B. Caverly and LeRoy Marks, Automobile Club of Washington, D. C.; Charles J. Forbes, Jr., Cleveland Automobile Club; Dr. A. B. Beyle, Cincinnati Automobile Club; Hon. F. H. Gillette, Automobile Club of Springfield, Mass.; L. R. Speare, Bay State Automobile Association and Massachusetts Automobile Club, Boston; Osborne I. Yellott, Automobile Club of Maryland; John Bancroft, Delaware Automobile Association, Wilmington; F. E. Chapman, West Virginia State Automobile Association; George Ade, Indiana State Automobile Association; S. Boyer Davis, Automobile Club of Philadelphia and chairman of the legislative committee of the Pennsylvania Motor Federation.

The Professional Chauffeurs' Club of America also was represented by President Sullivan and ex-President Walters, with Xenophon P. Huddy, its counsel. The latter discussed the bill briefly, urging chief-

ly that it be amended so as to permit the federal registration of chauffeurs while operating motor vehicles in states other than those of their residence.

President Caverly, Secretary Marks and Director Stoddard comprised the Automobile Club of Washington trio responsible for the entertainment of the visitors, the festivities including a smoker at the club's country home.

Congressman Cocks, who accepted responsibility for the bill in the house of representatives, isn't afraid these days to be seen in the company of motorists. When one remembers the unpopularity which this thoroughly straightforward legislator once enjoyed when, in the early days of the industry, he sought as a member of the New York state legislature to obtain a statute which in the light of subsequent events seemed liberal at the time, his present championing of the rights of motorists is not so remarkable after all. And there were other congressman who were not afraid to dine with the motorists in the glaring electric light of the New Willard on Wednesday evening. These were Malby, Alexander and Moon. When the work of organization of motorists has attained greater numerical strength there will be more legislators who are unafraid of their constituents to dine with motorists in public. In fact, it is not a wild prediction to make that if the federal bill can emerge from the committee it will receive enough votes to become a law.

ROCHESTER HAS A SHOW

Rochester, N. Y., March 18—Special telegram—According to the forecast, there will be $600,000 worth of motor cars and accessories in the local show which opens tonight and closes Saturday night. Eighteen car agents, five motor cycle dealers and twenty-six representatives of supply houses will occupy space. The list of exhibitors is as follows: Motors cars—United States Automobile Co., Selden Motor Vehicle Co., Davis & Goodenough, C. E. Hartson, Arthur McNall, C. L. Whiting, Genesee Motor Vehicle Co., J. J. Mandery, Gearless Transmission Co., Hollis-Rand Co., Caledonia Avenue Automobile Co., L. B. Kirkpatrick, A. V. Hart, Union Motor Car Co., A. M. Zimbrich, T. J. Northway, F. H. Elter, A. S. Lane. Motor cycles—Forest & Malone, L. A. Baker, Ward Fisher, F. L. Hughes, Commercial Motor Cycle Co. Accessories—McFarlin Clothing Co., S. B. Roby Co., Rochester Automobile Supply Co., Ideal Carriage Washer Co., Long & Mann Co., James Johnston, Cook Iron Store Co., A. Faber Co., C. L. Whiting, Rochester Rubber Co., W. H. Rowerdink, Knoll & Turgeon, Frank Eckler, Wheeler-Green Electric Co., Rudolph Schmidt, Wray Pump Co., Weaver, Palmer & Richmond, Rochester Timer Co., M. E. Wollf, W. D. Hayes, Worcester Pressed Steel Co., Warner Instrument Co., W. F. Polson, H. J. Zimbrich, Frank Gilfus, Bert Van Tuyle.

A. C. A. IS OUT OF A. A. A

New York Club Resigns From National Body and President Hotchkiss Is Pleased

Buffalo, N. Y., March 13—Something not entirely unexpected in view of recent developments came at the meeting of the New York State Automobile Association, held in the rooms of the Automobile Club of Buffalo yesterday. The announcement was made of the secession of the Automobile Club of America from the state association. This action is the culmination of a series of differences that have existed for some time, with a strong degree of unpleasantness, between the New York club and the state body of the national association.

From what was ascertainable locally, the New York club has been chafing under the restraint of the national and state bodies with which it is affiliated. One immediate cause assigned is the bill which the legislative committee of the New York State Automobile Association has drawn up. This bill is a model one in many respects. It provides that motor cars shall be exempt from taxation as personal property, but shall annually contribute a registration fee to the state on the basis of $2 for the first 1,000-pound weight, and 25 cents a hundred for each additional hundred pounds. This measure would bring about $350,000 in revenue to the state each year.

There is a story current here that A. R. Shattuck, one of the governors of the A. C. A., entertained some of the Albany legislators at the Fort Orange Club in Albany, and told them that the proposed registration in the A. A. A. bill was too cheap for a motor car, and "his organization," the A. C. A., would stand for a yearly tax of from $4 to $40, according to the weight of the car. The Albany legislators routed up the legislative committee of the state association and demanded to know what was meant by proposing a tax of from $2 to $4, when "those rich fellows in New York were willing to pay as high as $40 apiece." It was then the work of the state association to show who was representing the motorists of the state—the thirty-five clubs affiliated with the A. A. A., and extending from Yonkers to Buffalo, or the inside ring in the A. C. A., of New York City.

President O. A. Quayle, of Albany, maintained that Shattuck and the several governors of the A. C. A. who always attend meetings never represented that organization. However, Shattuck got busy and kept at it until he got the resignation of the A. C. A. offered. When the resignation was presented, a resolution regretting the action of the A. C. A. was adopted, and the paper laid on the table. President Quayle made the declaration that before any law is enacted taxing a motor car any $40 a year, it will have to pass over his dead body. He asserts he will resign before he will stand for anything like that. The attitude of President Quayle was indorsed by President F. B. Hower, of the local club.

Officers of the state organization elected yesterday were: Oliver A. Quayle, re-elected for the third time as president; Charles Jerome Edwards, of the Long Island Automobile Club of Brooklyn, vice president; C. D. Hakes, Albany, secretary, and N. M. Pierce, Buffalo, treasurer.

Relative to the resignation of the Automobile Club of America from the New York State Automobile Association, President William H. Hotchkiss has the following to say: "While the differences between New York's local club and the state association proper, which is a body of forty clubs, including one at Buffalo as large as the A. C. A., have been brought to a head by the contemplated action of the state body, requiring the New York club to pay dues on a per capita basis of its full membership, the breach dates well back and was originally opened by conflict over matters of a state policy in legislation. It is perhaps proper for me as president of the American Automobile Association to say that I do not regret the resignation, but welcome it. It is high time that motorists understand whether a mere name adopted in the infancy of the motor vehicle in this country, and which has since become a misnomer, entitles any local club in any city, no matter how great, to lord it over hundreds of other clubs in other parts of the country. Indeed, the time has now come to determine whether the American Automobile Association represents those motorists or whether they are to be represented by a small clique of gentlemen who manage a local social club. I, therefore, hail the issue and have no doubt of the results.

"The American Automobile Association is now composed of twenty-one state organizations, with an application in from the twenty-second state, and is represented by clubs in almost every state where motoring is general. It has absolute control of the sport in this country, and of all touring and technical contests, to say nothing of its premiership in matters of legislation, both national and state."

FRESNO HOLDS A SHOW

Los Angeles, Cal., March 14—The Fresno show opened March 12 and continued 3 days. The show, while not a large one, was very complete, most of the leading makes being represented. The crowds were large and the dealers all report a big business. Fresno is the heart of a rich country, and at the present time is the best motor car field in the state. The people in the valley have more money than ever before and the way they bought cars at the Fresno show is proof they are ready to spend it. A large delegation of motorists went from Los Angeles to attend the show and was there 3 days.

RUMOR WILL NOT DOWN

Visit of Joy and Budlong to Hartford Revives Story Packard Controls Columbia Plant

Hartford, Conn., March 16—Special telegram—While the Packard company will not say anything regarding the rumor, it is now asserted on good authority that the Packard company has actually acquired the plant of the Electric Vehicle Co. in this city. Ever since the local concern went into receivers' hands, it was rumored a sale was in progress, but this was strenuously denied by those directly concerned. It is said the Packard company will take possession in about a month. It is quite to be expected that M. J. Budlong will have direct supervision of the local plant.

Rather significant in connection with this rumor was the visit made to the Columbia plant by two members of the Packard forces, Messrs. Joy and Budlong. Mr. Budlong and his associate, Mr. Joy, were conducted through the big plant by Receiver Nuckols himself. Furthermore, Mr. Joy made many measurements while in the shops, and this is also regarded as significant. Rumor has it that the Packard gasoline commercial cars as well as the Columbia electric trucks and delivery wagons will be made at the Hartford plant. The Electric Vehicle Co. has not figured conspicuously as a factor in the commercial field for the past 2 years, but there still is a good demand for this line of cars, and it is but reasonable to assume that they would prove good sellers if placed on the market once more. Of course the optimistic faction, that is to say, that contingent which regards the acquirement of the plant by the Packard as a certainty, bases its hope on the fact that former President Budlong is affiliated with the Packard outfit now, and, it is argued, "why, if the Packard company has such a large plant, would it take the trouble to measure up the Hartford shops unless there really was something to it?" This is the same question that is going the rounds. The reports that the deal seems assured pleases Hartford, for it is believed the plant can be made into a good investment. That the Packard company will not talk on the proposition is regarded as a favorable sign by the local people.

The shops are running now with a force of about 110 men; at least this number was on the pay roll last week, and it is quite likely a few more will be added soon. Additional cars of the mark 48-2 type have been ordered put through, and this will keep things moving for a few weeks.

Halsey M. Barrett and Henry W. Nuckols, receivers of the company, have filed with the superior court the following report of business done for the month of February. The report shows sales of $16,880.43, and purchases were made to the extent of $3,594.94. The amount of cash on hand on February 1 was $21,951.44, and the receivers have collected on the Electric Vehicle Co. account $4,149.19 and on the receivers' account $15,765.36. Payments on Selden royalty amount to $1,335.74, making a total of $43,201.73. The total expenditures were $13,144.83, leaving a cash balance of $30,056.90, which is a gain by $8,105.46 over the previous month.

CADILLAC TEST SUCCESSFUL

Chicago, March 14—The Cadillac's standardization test which took place in England under the supervision of the Royal Automobile Club was successful, according to a cablegram to the Chicago Daily News, which says: "The three American cars, made up from a haphazard selection of parts, flew around the Brooklands course, a distance of 500 miles, at the rate of 34 miles an hour without a hitch and all the cars ran wheel to wheel the whole way as if they were harnessed together. The spectacle was so wonderful that it called forth intense excitement. At the conclusion of the test the Americans invited the Royal Automobile Club to select any one of the three cars and preferably that composed of parts drawn from the widest range of selections, lock it up in the club motor house until the beginning of the 2,000-mile trial in June and then take it out and run it in that trial. The object of this is to prove that the car has not been specially prepared for the trial as cars, as a rule, are prepared. Whether the club will accept the offer is not yet known. Meanwhile manufacturers in any quarter of the world have a chance to win $5,000 if they can duplicate this week's feat with three cars of any make, each of which costs as much as these three American cars combined. I predict in the fact of a sporting enterprise of this sort that in a short time there will be nothing left of the tradition in Europe that the Americans cannot make motor cars comparable with those made over here."

GIVE CUP TO THE RAMBLER

Los Angeles, Cal., March 14—At a regular meeting of the Automobile Dealers' Association of Southern California the W. D. Newerf cup in the $2,500 class of the Pasadena hill-climb was awarded to W. K. Cowan's Rambler. The official time as first announced gave the Pope Hartford as the winner, but on the evidence of A. J. Smith, who had charge of the timing stand, it was shown conclusively that the time of 2 minutes 27 seconds, as caught by James Cowan, who rode in the car, and several outsiders, was correct. The association also adopted resolutions on the recent death of L. C. Lull, who was president and manager of the Auto Vehicle Co. J. W. Conwell, who has had charge of the San Francisco branch for this company, will succeed Mr. Lull. William J. Batchelder & Co., agents for the Stearns, were admitted to the association.

RACING TO THE COAST

Thomas on Last Leg of Journey to 'Frisco in New York-Paris Trial—Story of the Week

Chicago, March 18—When the contestants in the New-York Paris race awoke this morning they realized it was the completion of the fifth week since leaving Gotham; that had they made the trip across the American continent as per schedule they now would be nearing Alaska, whereas San Francisco still is many miles away from the leading car, the Thomas, while the tailender, the Motobloc, was still tied up in Iowa, from which point it will be shipped to Frisco by freight because of its condition. Brinker in the Thomas was at Tecoma, Nev., last night at supper time, 1,251 miles ahead of the Motobloc, at Carroll, Ia. In front of the latter and 95 miles ahead of it Dion at Omaha, 251 miles ahead of Koeppen. The Zust was at Marston, Wyo., 943 miles ahead of the Chicago Motor Club car and the Thomas was leading the Italians by 308 miles.

All through the week it has been a chase on the part of the Zust to make up ground on the Thomas. One day it would gain some, then the next day slip back to the triple century mark again. Last Thursday the Thomas made good progress, finding the roads fairly good, checking at Granger, Wyo., after having been given an overhauling at Bitter Creek that morning. The Zust was in hot pursuit and after an all night run had made Cheyenne for an examination before tackling the Rockies. The de Dion, pushing on to Omaha, had been 29 hours on the road. The Protos, after an uneventful day, had reached Marshalltown, while the Motobloc, which had been shipped by train to Clinton, Ia., for repairs, had run back to Dixon, Ill., on the road, then back to Clinton in order to obey the rules.

By Friday night the Thomas was nearing Wyoming, closely pursued by the Zust, while the de Dion still battled with the mud in Iowa. The Motobloc had picked up some lost ground, while the Protos experienced tire troubles. The Thomas used

DAY BY DAY PROGRESS OF CARS

Date	Thomas	Zust
March 12.....	Granger, Wyo. 2,390 miles	Cheyenne, Wyo. 2,052 miles
March 13.....	Evanston, Wyo. 2,460 miles	Laramie, Wyo. 2,109 miles
March 14.....	Castle Rock, Utah 2,480 miles	Hanna, Wyo. 2,186 miles
March 15.....	Ogden, Utah 2,536 miles	Rawlins, Wyo. 2,226 miles
March 16.....	Ogden, Utah 2,536 miles	Wainsutte, Wyo. 2,257 miles
March 17.....	Tecoma, Nev. 2,632 miles	Marston, Wyo. 2,293 miles
March 18.....	Cobre, Nev. A. M.	Granger, Wyo. A. M.

the right of way of the Union Pacific because of the frightful condition of the roads. The poor de Dion dropped into a mud hole and it took the Frenchmen 6 hours to move the car 100 yards. The Protos only made 38 miles because of tire troubles and was forced to go back to Ames, Ia., to await a shipment of tires.

Matthewson drove out of Wyoming into Utah Saturday and because of a blinding snowstorm was compelled to take to the rails, the roads between Carter and Ogden being impassable. The Italians were battling in the mud and running at night time. The Protos was tied up waiting for tires, while the de Dion stopped at the Union Pacific shops in Omaha for an overhauling. It was at this place that Autran discovered why he had had so much transmission trouble. Upon opening the old transmission case he found a 3-inch piece of tool steel, two nuts, a washer and a 2-inch cotter pin.

Sunday the Thomas forced its way through the mountains and after a 25-hour run reached Ogden, Utah. There was a battle with snow drifts to slow Mathewson as well as an exhaustion of the gasoline supply. The Zust took a chance and made a perilous run on a trestle over the North Platte railway bridge, not being able to cross on the ice, as did the Thomas. On Monday Harold Brinker relieved Mathewson in the Thomas and the Americans started on the last 1,000 miles to San Francisco. The Zust was crossing the Red Desert.

WHITE STARS IN HILL CLIMB

San Francisco, Cal., March 8—The hill-climbing at Buena Vista heights yesterday produced interesting competition, the winners being the White and Tourist, the former capturing three of the classes. The ascent was a mile and a furlong in length. Summary:

Class 1, for cars listing under $1,500—Tourist won; time, 2:10 2-5. Dorris, second; time, 2:31 2-5. Aerocar, third; time, 2:55 4-5. Dragon, with flat tire, fourth; time, 4:18.

Class 2, cars listing under $2,500—White steamer won; time, 1:55. Dorris, second; time, 2:05. Tourist, third; time, 2:14. Auburn, fourth; time, 2:29 2-5.

Class 3, cars listing under $3,500—White steamer won; time, 1:56.

Free-for-all—White steamer won; time, 1:38 4-5.

IN THE NEW YORK-PARIS RACE

De Dion	Protos	Motobloc
Mo. Valley, Ia. 1,516 miles	Marshalltown, Ia. 1,332 miles	Clinton, Ia. 1,181 miles
Crescent, Ia. 1,524 miles	Ames, Ia. 1,369 miles	Cedar Rapids, Ia. 1,263 miles
Crescent, Ia. 1,524 miles	Ames, Ia. 1,369 miles	Cedar Rapids, Ia. 1,263 miles
Omaha, Neb. 1,536 miles	Ames, Ia. 1,369 miles	Tama, Ia. 1,313 miles
Fremont, Neb. 1,582 miles	Denison, Ia. 1,467 miles	Ogden, Ia. 1,394 miles
Grand Isl'd, Neb.	Omaha, Neb. 1,536 miles	Carroll, Ia.
Omaha, Neb. Left at noon	Omaha, Neb. Left at noon	Carroll, Ia.

ROBERTS BACK TO RACE

Thomas Expert Now in New York Preparing To Sail for France To Drive in Grand Prix

New York, March 16—Montague Roberts having returned from the New York-Paris race, work on the Thomas racer entered in the French grand prix will be pushed rapidly in order that the car may be on the course in ample time for the driver to familiarize himself with every turn and grade. No mechanic has yet been selected, the choice, it is declared, resting entirely with Roberts. It is anticipated that the car and its driver will sail for France about the middle of May. Only one racer will be built, but two cars will be sent abroad, the second one to be used in practice work on the course.

Thought not in every detail a stock chassis, the grand prix Thomas Flyer is a much nearer approach to the regular factory output than the majority of racers. The French Derby calls for cars of not more than 6.1 inches bore for four-cylinder engines, and of not less than 2,425 pounds total weight; in all other features constructors are absolutely unfettered. The standard Thomas car, known as the 4-60 Flyer, has a four-cylinder motor of 5½ bore by 5½-inch stroke, obviously too small to compete against the 6.1 by 7.08 foreign racers. On the standard engine base, however, it will be possible to fit cylinders of the maximum bore of 6.1 inches, declares F. P. Nahreas, superintendent of the E. R. Thomas company, and this will be the only essential in which the racer will differ from the standard 1908 runabout.

In all probability the engine stroke will not be increased, for this could not be done without altering the entire motor design, and the desire of the factory is to remain as close to stock models as possible. Valve arrangements will be identical with those of the 60-horsepower roadster, inlet and exhaust valves being in pockets on opposite sides, operated by separate camshafts. Bosch high-tension magneto will be fitted, with possibly an Atwater-Kent spark generator for use in starting up. Lubrication and engine cooling remain unchanged, the former consisting of a mechanical six sight-feed oiler, and the other of a centrifugal pump, cellular radiator and two fans. The carbureter will be the Thomas automatic water-jacketed type with auxiliary inlet.

Some changes may have to be made in gearing on account of the higher power which the car will develop, and also to fit it for the course on which the race will be run. In principle, however, the grand prix racer will not differ from the current runabout model. A metallic three-disk clutch will be used, the transmission will be of the selective sliding gear type, giving four speeds forward and reverse, and final drive will be by side chains. The wheelbase will be 112½ inches. A 36-gallon gasoline tank will be carried in the rear. No decision has yet been made regarding the tire equipment for the grand prix racer. It is certain, however, that demountable rims will be employed, the conditions of the race under which every driver has to make all repairs, adjustments, etc.—being, in a word, debarred from all outside help—making them essential.

BUFFALO HAS RECORD SHOW

Buffalo, N. Y., March 16—Without a dissenting voice motorists have expressed the opinion that Buffalo's motor car show, which closed Saturday night, eclipsed all previous exhibitions of the kind in this city. According to a careful estimate between 25,000 and 30,000 persons saw the cars that were exhibited. The exhibitors are pleased with the results because the total value of the cars sold last week was considerably greater than at any previous exhibition. Many good prospects were discovered. Boulevard night on Thursday was one of the features of the show. The admission fee was $1, and the receipts will be added to a fund to be used in connection with the construction of a boulevard connecting Buffalo and Niagara Falls. Secretary Lewis will attempt to duplicate his Buffalo success in Toronto, where he will assist in the management of the Toronto show, which opens Saturday night. One of the new cars exhibited at Buffalo was the Chief, manufactured by the Chief Mfg. Co., whose office is located at 624 Ellicott square Buffalo. The Chief has a two-cylinder two-cycle 10-12-horsepower engine.

QUAKER DEALERS IN TROUBLE

Philadelphia, Pa., March 16—Special telegram—Judge Holland in the United States district court today appointed the Equitable Trust Co. and Samuel C. Myers receivers of the Dragon Motor Car Co., Thirty-first and Chestnut streets. The appointment was made upon the petition of John C. Calhoun, of New York, who has brought suit on a claim of $2,400, $2,000 of which is represented by note, for money loaned. The concern's assets are said to be about $3,300. The receivers will enter security in the sum of $5,000. While the motor car company agreed to the receivership, its officials deny its insolvency. They declare that an illegal distraint has been levied by the J. G. Brill Co., owner of the Thirty-first street premises, for an amount largely in excess of that which is due. According to the answer filed by the motor car company to the bill of complaint filed against it, it appears that the Brill company has a claim for 5 months' rent due from a previous tenant, the Dragon Automobile Co., which has undertaken to indemnify the motor company against the rent claimed, and it is declared that the Brill company agreed to look to the automobile company for payment.

PILOTING ADVENTURES OF THE GEARLESS

FORGETTING the Indiana unpleasantness, one of the most prominent features of the New York-Paris race has been the courtesy shown the foreigners. All along the line the glad hand has been extended and at Chicago the two clubs vied with each other in entertaining their visitors. But one of the most practical demonstrations of hospitality was made by Gearless Transmission Co., of Rochester, N. Y., which sent a pilot car from Geneva, N. Y., to Chicago, with the Zust, and also showed the Italian car the way out of the latter city. The Gearless, it will be remembered, also acted as pilot for Pedestrian Weston in his great walk to Chicago. In both these trips there were incidents out of the ordinary. Some of the features of the recent jaunt are told in the following:

GEARLESS PLOWS THROUGH INDIANA SNOW

When the Gearless hauled up at the roadside at Geneva, N. Y., to await the Zust, no one knew it for the beginning of a long winter trip. Like the Great Harry she came—the Zust—high of poop and low of stem, thundering broadsides across the snow waves, and the Gearless dived for its place and the trip was on. Following the frozen

WEST OF WATERLOO, IND.

Genesee on through Scottsville and LeRoy, the old, old way, but so different in the frosty moonlight, they arrived at Batavia and found—nothing. The Buffalo pilot car was not. So the Gearless people went likewise, and at once, to discover at Silver Creek that there was much pother; in the Sleeping City, hasty repairs, curses and mighty preparations for pursuit; then, finding themselves in the lead, they cut the pace to decency, with visions of Ashtabula as the night's stop. But Ashtabula turned Ripley and more radius rod repairs. Then after an all-night job they again took the road.

It was again midnight when the two cars backed out into the northwest storm to begin the race which was to cut the 127 miles to a bare 11 before the carelessness and indifference of the custom officials at New York intervened, forcing the Zust to pause upon what seemed surely a road to victory. To Cleveland the way had been normal and lacking in any special characteristic, but beyond in the storm lay a land of romance. On such a night to start for nowhere is dismal. Once the lights of Rockey River were behind, there were no others, nor was there a road. Mile after mile the cars plowed a trackless, rolling plain, indistinguishable from the fields which skirted it. Noon brought Toledo and breakfast and a counsel, as they took stock of our forces. The Thomas and de Dion were still ahead, so they decided to continue, and left at 3 o'clock in the worst storm they had yet encountered.

Before the snow was merely a discomfort, but now it began to be a hindrance, and the farther they went the more hindrance it became. Thirty miles to Wauseon took them 6 hours.

Night, their third of continuous driving, overtook them in the wilds. They were in Indiana and knew it, too, by now. At midnight they met their worst drift, and

SAMPLE OF OHIO WINTER ROADS

here things became serious, for after being in it for 2 hours they began to have trouble in keeping each other awake; then, too, the drift made faster than they could dig it away. Finally those ahead grew desperate and jumped and plunged with the Gearless until the drift opened and they passed on their way, arriving and basking in St. Chaffray's smile at 3 a. m. after 67 hours on the road and after reducing 127 miles to a bare 11, for the Thomas, at the approach of the Gearless and Zust, had left in the night and moved to a little town ahead. The remainder of the trip was uneventful; snows were deeper, going was harder, but the weary ones slept and ate, joined mostly with the de Dion and content to travel with their friends. The Zust lost a full day at Kendallville, due to no other cause than at New York in the custom house the car stood with a full radiator, and in spite of repeated protests none was allowed to touch it. The result was a frozen radiator, which split across the top and now opened, laying up the car. It was hard to see all the Zust had won be lost, but they

BETWEEN GENEVA, N. Y., AND CANANDAIGUA

could not help it. "That was a strange country, that Indiana," yea and a mighty wonder. Undoubtedly the trip through Hoosierdom will stand out most prominently when the final history of the race is written, not forgetting the blizzard or the importunate "peasantry." The racers met the Indiana brigand first in a phoney snowdrift he had constructed and which the Gearless spoiled, thereby saving all $10. Secondly, they met him and they were his. Generally speaking, they were always his. Thus they progressed, without food, fierce-looking wild-eyed men; ahead a long red demon and behind the Great Harry filled with untamed Cossacks and barking defiance across the land. And these men and this great ship on wheels, this 7,500 pounds of car, clothing, rifles, provisions, parts and even tallow candles, 20 pounds of them, are to cross the world and tackle the arctic.

STUDEBAKER WAR CAR PROVES ITS UTILITY

ONE of the most interesting pages in the history of the winter's motoring struggles will be that which will record the startling feat of the Studebaker war car, which carried a military message from New York city to Leavenworth, Kan., in 18 days 2 hours 32 minutes, under the most strenuous conditions ever encountered by the modern motor car. The public is familiar with the struggle of the Studebaker from New York to Chicago, in which it fought a mighty battle with the elements, which tied up ordinary traffic by means of the most severe blizzard that has visited this country in years; how the Studebaker and its relay of drivers overcame these difficulties and rolled into Chicago 1 week 5 hours 25 minutes after it had left New York, and ahead of every car in the New York-Paris race that started from Gotham 6 days ahead of the Studebaker. But it is of the struggle from Chicago to Leavenworth that is as yet unwritten history and which will be found to tell of an even more strenuous battle than that encountered on the first part

DELIVERING THE MESSAGE AT FORT LEAVENWORTH

CHECKING IN AT FORT PORTER, BUFFALO

of the journey from New York to Chicago—a battle with mud so deep and sticky that at times the Studebaker drivers felt they would have to give up the tiresome struggle.

Charles Eisenminger took the car out of Chicago at 5:20 o'clock Wednesday morning, February 26, and reached West Chicago before he ran into the snow. He conquered the bad drifts and reached Dixon, Ill., at 2 o'clock Thursday morning, where Jack Huge, who, with W. L. Walls, Charles Hamann, George Smithson, J. H. Hodges, Milton Smith and Charles Loy, had handled the wheel in relays on the first leg of the journey. Although fighting extraordinary conditions to Lincoln, Neb., which was reached at 3:45 o'clock Monday afternoon, it was not until the dispatch carriers passed Lincoln that they really ran into the mud belt. Huge and Smith left Lincoln at 3:45 o'clock Monday afternoon on the last leg of their run to Fort Leavenworth by way of Beatrice, Neb. The long detour by way of Lincoln and Beatrice was rendered necessary owing to the floods that had inundated the valley of the Missouri river. Beyond Lincoln the roads beggared description, and the farther they went the worse they were. When they finally got into Kansas the mud was so deep and sticky that they could only make progress at a snail's pace. The road was a mixture of black gumbo and yellow clay so deep that shortly after leaving Wetmore, Kan., the under bonnet stuck in the mud and, in trying to pull it out, the bonnet was torn away and left in the middle of the road. They left Wetmore at 6 o'clock Thursday evening and at 11 o'clock that night were still 2 miles from Netawaka, having covered but 4 or 5 miles in as many hours. Finally the car became so deeply mired that both Smith and Huge fell exhausted by the roadside and had to give up the fight. They managed to stagger to a near-by farmhouse and asked for a place to sleep. The farmer was unable to accommodate them, but hitched up a farm wagon and drove them to Netawaka. When he got there he found both so sound asleep on the bottom of the wagon that he had difficulty in arousing them. After 4 hours' sleep Huge and Smith returned to the car and secured assistance to pry the car out of the mud. They made but little headway, however, and it took them nearly 12 hours to get to Whitney, only 10 miles away. They had to use planks time and again to get the car over deep ruts and on numerous occasions had to build a road bed of brush to enable them to get through mud that threatened to submerge the car. At other times they went through soft-plowed fields in order to get around quagmires that were impassable. When they reached Whitney that night both Huge and Smith were unable to move a step farther, so they put up there for the night. When they started out the next morning they found that not only were the roads firmer, but that a stiff breeze which had sprung up during the night had dried up the mud.

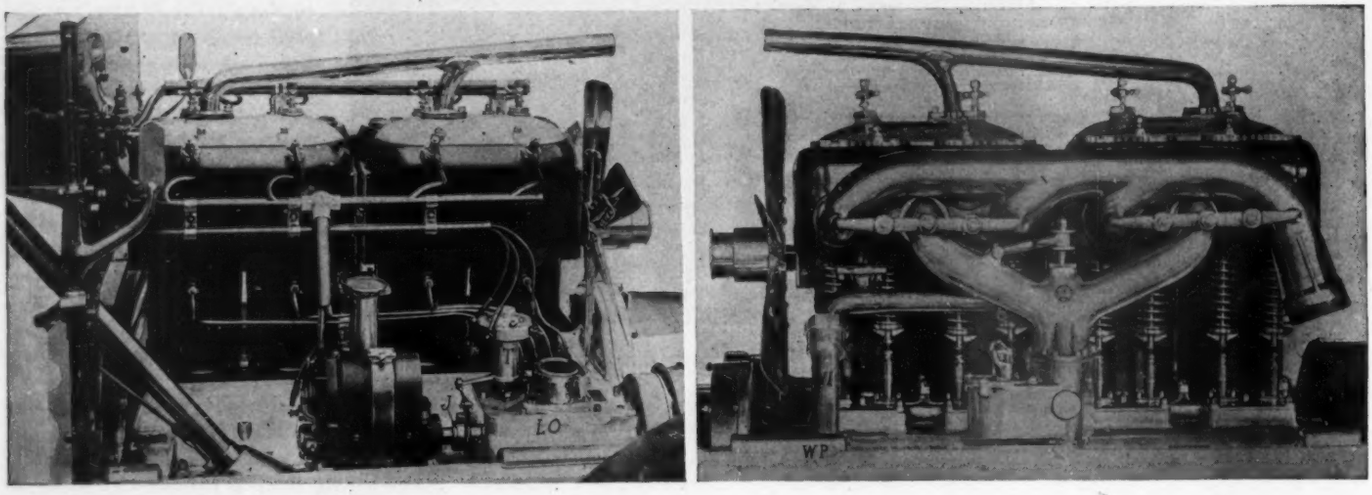
JACK HUGE, A STUDEBAKER DRIVER

WAR CAR AT LINCOLN, NEB.

The reception accorded at Atchison, Kan., was the most enthusiastic they had yet received. They found the town decorated with flags in their honor, and they received a right royal welcome and were given a splendid dinner. They arrived at Atchison at 4 o'clock Friday afternoon and were obliged to stay there for a few hours' sleep. Saturday morning at 5 o'clock they started for Fort Leavenworth, arriving at the end of the journey at 11:32 the same morning, 18 days after leaving New York, having covered a distance of a little over 2,000 miles.

Five miles outside of Fort Leavenworth the dispatch car was met by a large delegation from the local automobile club, and the drivers were presented with the key to the city by the motorists.

FIELD OF MOTOR CAR DEVELOPMENT

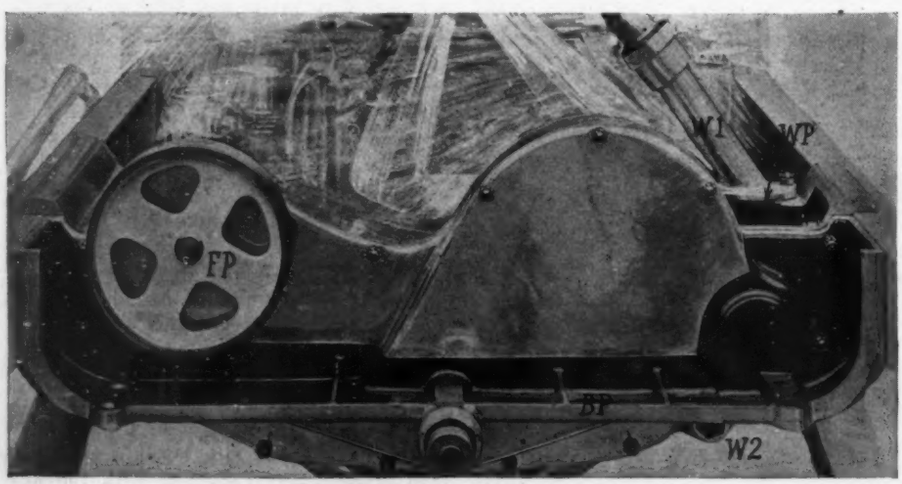


RIGHT AND LEFT SIDES OF STEARNS FOUR-CYLINDER 1908 MOTOR

THE 1908 STEARNS

THE Stearns car for 1908 is but an evolution of the 1907 machine and the chassis is a perfecting of the models of the previous years. For this season the four-cylinder car is a 30-60-horsepower car with cylinders having 5⅜-inch bore and 5⅞-inch stroke. Coupling it with the rear wheels are expanding clutch, four-speed selective gearset and side chains. The car is a ball-bearing output containing no fewer than forty-four D. W. F. ball bearings distributed as follows: Wheels, eight; transmission, thirteen; motor, ten; fan, two; clutch, three; steering parts, four, and magneto, four. In the motor three ball races carry the crankshaft and four carry the camshaft. The improvements as compared with the 1907 machine include carbureter refinements, new motor accessory arrangements, transmission improvement and frame steering gear changes.

The Stearns four-cylinder motor resembles in general layout the 1907 one in that its cylinders are cast in pairs with valves in an integral chamber on the left side and opened by direct lift from a camshaft within the crankcase. The cylinder castings are made without heads for the water jackets and take large oval plates instead. While this part of the design is as a year ago, great changes have been made in the arrangement of the water pump, oiler, timer and magneto. The water pump is carried within the left front motor arm, its position being indicated at WP in the left side engine illustration, as well as in the front view of the motor. Standing beside the engine it cannot be seen, its location being indicated, however, by the pipe W1, which leads from the top of the motor support arm to the waterjackets on the valve side. The crankcase is cast with a bedplate BP across its forward end, which forms a support for the radiator, thereby taking the radiator entirely away from the chassis frame and making it a unit with the motor crankcase.



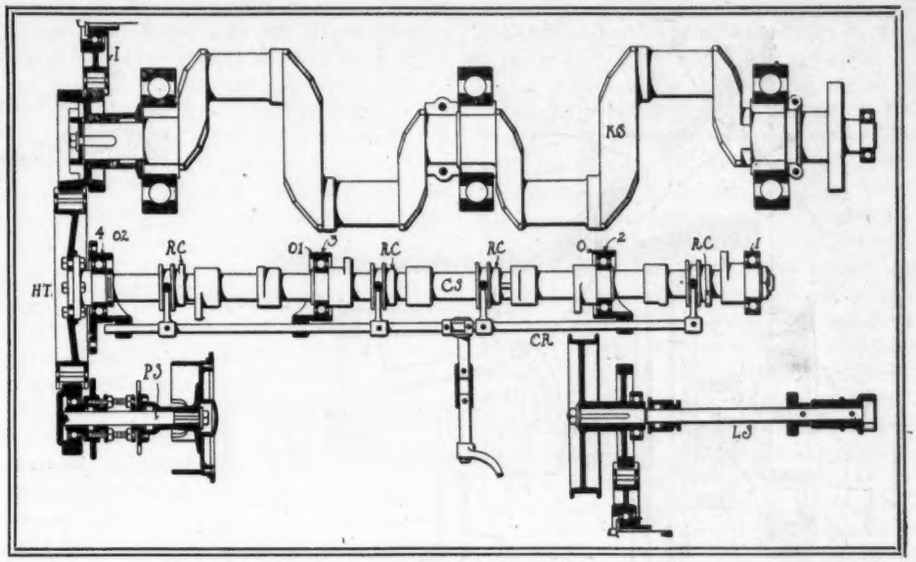
STEARNS CRANKCASE WITH INTEGRAL RADIATOR SUPPORT

This construction brings the radiator and pump so close together that a hose connection between them is unnecessary, the only tubing essential being an elbow from the base of the radiator to an opening W2, whence the crankcase is drilled to the housing of the water pump. To remove the water pump, which is on a separate shaft, it is but necessary to take off a large diameter cap threaded into the rear face of the motor arm containing the pump; this removed, the vein of the pump is reached. The vein part is secured to the end of the shaft by nut and locking means.

Glancing at the right side of the motor appears another example of what use can be made of the supporting arm of the motor. A multi-feed Lavigne oiler L has as its casing the aluminum supporting arm, just as the water pump has as its casing the supporting arm on the opposite side. A separate shaft gear-driven through an idler from the crankshaft, drives the bank of pumps in the oiler and has on its rear end a jaw coupling J for connection with the magneto. On the shaft is a helical gear for driving the short vertical shaft of the timer T. This arrangement gives a most compact grouping of the oiler, timer and magneto, and leaves ample room for the steering gear, the lower portion of the column of which appears in the rear of the magneto. The magneto rests on a bed plate which fills the rectangle between the crankcase, the frame and the front and rear motor-supporting arm. In the elevation drawing of the right side of the motor appears the arrangement of the four pumps within the oiler, as well as the helical gear HG on the oiler shaft for driving

the timer. This illustration also shows the fan pulley FP, which is placed on the end of the pump shaft.

In the diagrammatic illustration of the motor shafts appear the four shafts necessary, KS, the three-bearing crankshaft carried on as many races of DWF bearings with balls 1 inch in diameter; the camshaft CS carried on a set of four races of DWF bearings; the pumpshaft PS mounted on similar bearings, with its double packing glands; and the lubricator shaft LS, which is shown in the lower right. On the crankshaft are two pinions, one for driving the idler I for transferring to the oiler shaft, and the other for driving the large half-time gear HT, which in turn drives the pump shaft. There are in all ten DWF bearings in connection with the motor. The Stearns crankcase is a one-piece casting instead of the conventional upper-and-lower-half case and because of this the crankshaft, camshaft and other motor shafts must be removed endwise through the front of the crankcase. When removed the bearings are taken off with them. This is accomplished in the following manner: The rear bearing 1 of the camshaft is held direct in the end of the crankcase; the second bearing 2 has a bushing 0; the third bearing 3 has a bushing 01 of greater diameter than the bushing 0 on the second bearing; and the fourth bearing 4 has a bushing 02 larger than either of the other bushings. In removing the camshaft these bushings are removed with the bearing and the shaft, so that the opening in the front end of the case containing the bushing 02 is of sufficient size to let the remaining bearings, 1, 2, 3, with their bushings, pass through with ease. The same practice is followed with the bearings for the crankshaft. This illustration also shows the compression release scheme to assist in starting, whereby through the rod CR a set of four relief cams RC are slid on the



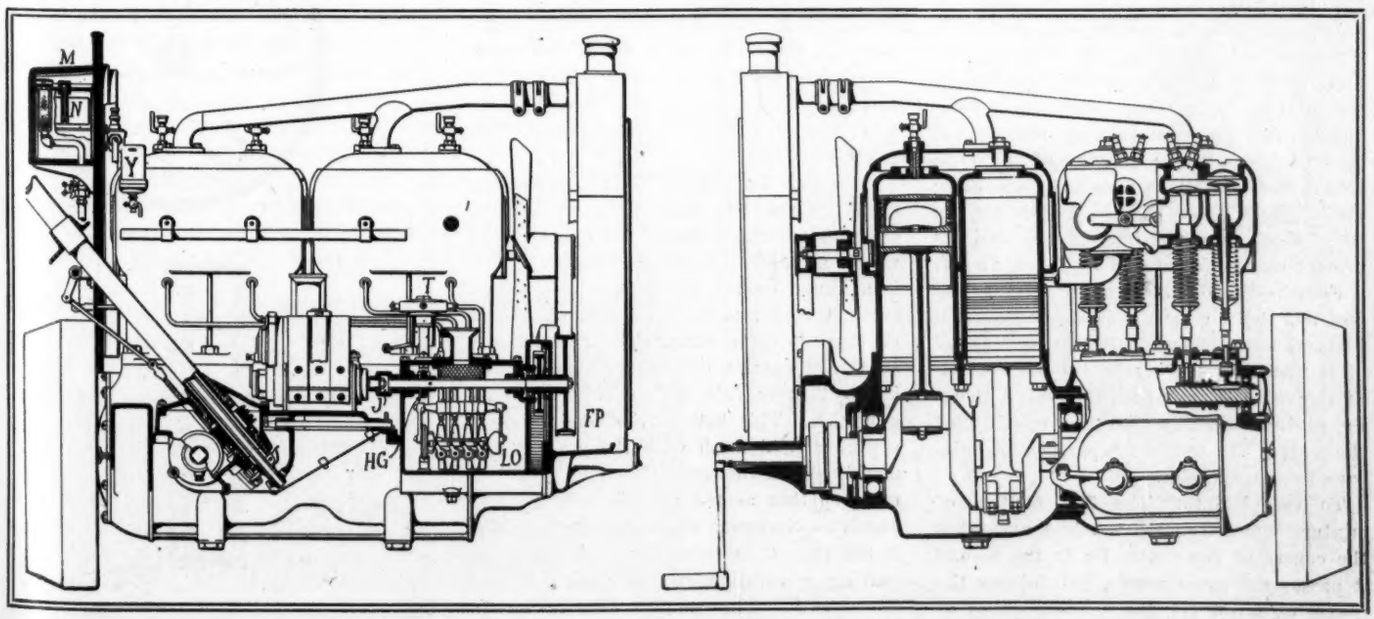
ARRANGEMENT OF MOTOR SHAFTS IN 1908 STEARNS MOTOR

camshaft CS, the movement of the rod CR being by pull button at the base of the radiator.

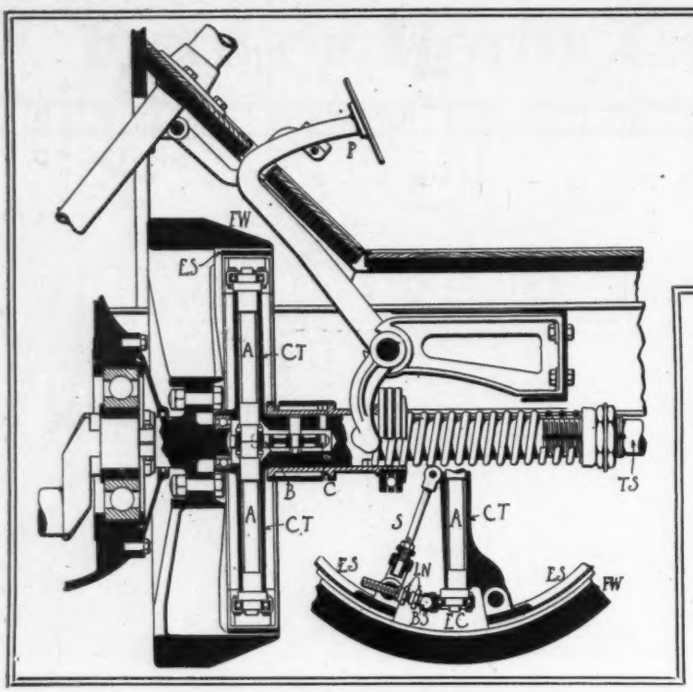
No other part of the Stearns car has received more attention than the carbureter, and to which the designer attributes no little part of the smooth running of the motor. It is of the two-nozzle type, as shown in the sectional illustration which represents the carbureter as viewed from the front end of the motor. The smaller nozzle A, located in a mixing chamber of its own, generates up to 30 horsepower, the larger nozzle B being brought into use only when power and speed above that furnished by the nozzle A are required. The passage from the motor is marked C. This carbureter offers four controls over the mixture, all of which controls are mechanically effected from a lever on the steering wheel. The controls are briefly as follows:

First—To keep the motor just turning over when the car is standing. Air enters through a fixed air opening A1. This air rising past the nozzle A passes up the tubing A2 and follows the course indicated by the arrow H through a small opening regulated by the cone-tipped adjusting screw A3, and thence finds its way out of the exit C to the motor. The exact amount of mixture permitted can be regulated by the adjusting screw A3.

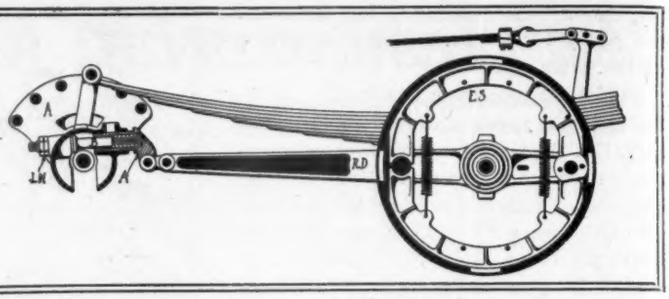
Second—When starting the car, after it has been standing by the curb with the engine running, the plunger L is depressed by means of the control from the steering wheel, the means of accomplishing this being illustrated in the elevation of the carbureter. Depressing the plunger L opens the valve A4, which allows the mixture passing the small nozzle A to follow the course of the arrow H1 instead of going through the by-pass channel as indicated by the arrow H. This allows the full capacity of the chamber A2 to pass to the motor, and to supply air for this the automatic valve A5 is brought



SECTIONAL DRAWING SHOWING BOTH SIDES OF 1908 STEARNS FOUR-CYLINDER MOTOR



SECTION STEARNS EXPANDING CLUTCH



RADIUS ROD USED ON STEARNS CAR

into action. With this arrangement it is possible to secure 30 horsepower from the Stearns motor.

Third—Should still more power be demanded the plunger L is further depressed. There is $\frac{1}{16}$-inch space between the lower end of the plunger L and the valve stem L1, which gives the valve A4, already referred to, that amount of opening. A further depression of the plunger rod L opens the valve V and immediately the big nozzle B is brought into action in that the motor suction brings air past the automatic valve B1, past the nozzle B through the mixing chamber B2, past the valve V and thence to the motor. The valve V in opening uncovers the ports S in a larger diameter valve X, and as it opens it slides through a short sleeve V2, which has triangular teeth in it, so that the valve in opening allows air to enter through the smallest of the teeth spaces first, thereby giving a gradual passage to the mixture until when the valve is fully opened, and the triangular spaces are uncovered for the free passage of the mixture. The illustration does not show these teeth. This valve V is held open by the lever F on the steering column and its prompt closing is assured by the spring T.

Fourth—Should still more mixture be desired, the plunger L is depressed still further, until it forces the expanded end of it upon the top of the tubular stem P of the valve X and opens this valve, thereby giving, according to the opening of the valve, the maximum passage of mixture to the cylinder.

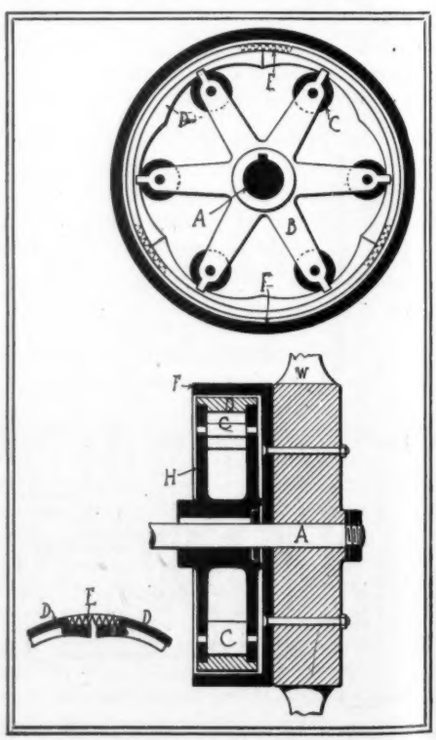
To recapitulate: The first control of mixture comes from the nozzle A and takes the course of the arrow H; in the second it passes the same nozzle, but follows the course of arrow H1 due to the opening of the valve A4; third, the valve V opens, bringing the large nozzle B into operation; fourth, the valve X opens, bringing the maximum supply past the nozzle B and and at which time all the other three controls are apen.

The nozzle A is designed so that its tip is slightly higher than the level of the gasoline in the float chamber, so as to avoid overflow, and permit of easy starting of the motor; the nozzle B has its tip $\frac{1}{8}$-inch higher. In the nozzle A is but a single central orifice through which the gasoline exits; the nozzle B has two orifices, the size of which is determined when the motor is being tested, and the bore of these openings is adjusted to the greatest nicety to harmonize with the compression of the cylinders. The bore of the opening in the nozzle A is fixed for all motors. Both mixing chambers are water-jacketed, W marking these spaces.

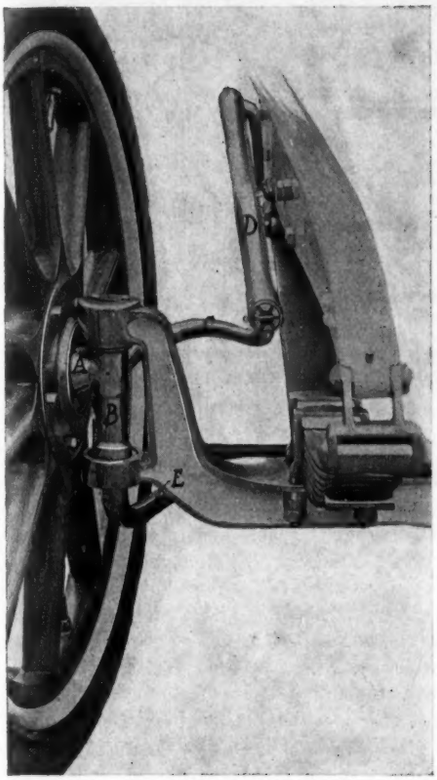
In the elevation of the right side of the motor on the dash is shown the small gasoline tank M, which feeds the carbureter, the gasoline from the main tank carried on the rear of the chassis being forced by exhaust pressure into the running tank M, its entry therein being regulated by a float N which maintains a predetermined level in the tank. In front of the dash and shown in the same illustration is a strainer Y in the gasoline exhaust line.

Retained for 1908 is the expanding clutch which has been used on Stearns cars for several seasons, the operation of which is partly illustrated herewith. FW is a flange on the flywheel, within which are expanded two shoes ES. The expansion of these is interesting. The transmission shaft TS carries on its forward end an integral cross tube CT, within which is a bolt A. This bolt carries on its center a pinion B in mesh with the gear C, and meshing with this gear C is a longitudinal rack, so that as the rack is moved backwards to disengage the clutch by the pedal P the gear C is rotated, and in turn imparting a rotation to the pinion B and the rod A. The smaller illustration in the lower right will explain how the rotation of the rod A works the expansion of the shoes ES against the flywheel flange FW. One end of each expanding shoe attaches to the tubular piece CT; the other end is supported by the swinging arm S. On the end of the rod A is an eccentric EC, so that as A rotates, the eccentric acting through the ball and socket linkage BS works an expansion of the shoe ES. The exact amount of this expansion is easily adjusted by the nuts LM. It will be borne in mind that there are two expanding shoes ES in the clutch, each being semicircular and secured at one end to the piece CT and at the other end to the swinging support S. The expanding shoes are leather-faced.

In the Stearns gearset the use of a four-speed selective set with direct drive on the fourth speed is continued. This gearset remains practically as it was in 1907, except for change in the design of the case to give compactness and add strength. In all thirteen DWF bearings are used. A universal coupling is interposed between the clutch and gearset. Side-chain drive is continued, and the adjustment of the chains is illustrated, in which RD is the radius rod, swivelled at its rear on the axle, and hinging at its



SECTION OF LE MOON AXLE CLUTCH



STEARNS STEERING KNUCKLE

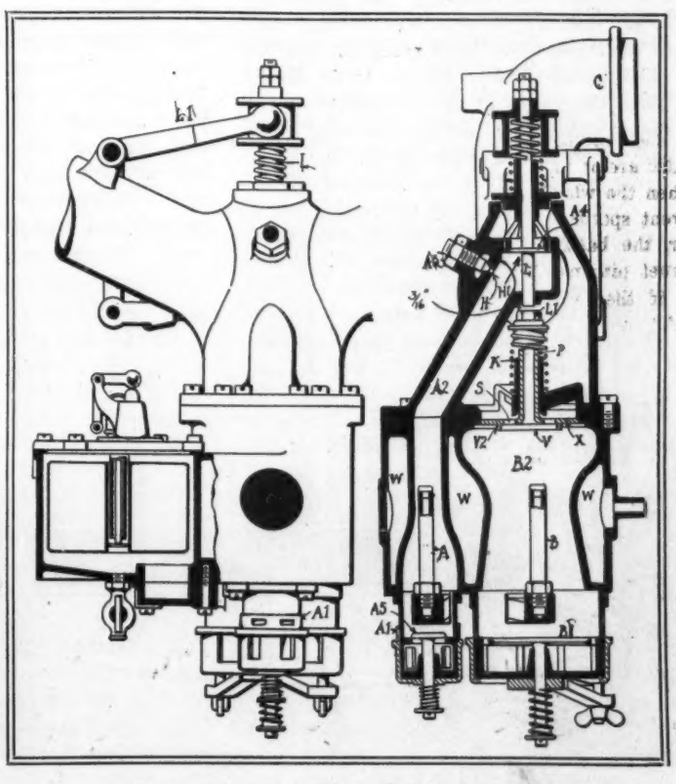
front to a member A, with spur to which the rod attaches. Threaded into this sleeve is a rod B, which is adjusted by nut and lockout LN. The illustration further shows the expanding shoe ES of the emergency brakes, which is a bronze member that acts within the steel drum on the wheel.

The improvements in the running gear largely center around the steering knuckle, although the frame has been dropped 2½ inches in front of the rear axle to give a lower body carriage; except for this the side members are straight from end to end. In the steering knuckle the great change is the forging in one piece of the spindle A for carrying the wheel, the hub portion B forming the pivot, the arm E with ball end for connection with the tie rod to the opposite knuckle and the knuckle arm C, which connects to the draglink D that couples with the steering gear. New also is the use of a DWF bearing in the top of the knuckle, which carries the weight of the car. After making these four parts, A B E C, integral, it was necessary to make the opening in the lower end of the axle jaw of sufficiently large diameter so that the hub B could be pushed through the opening until the top of the hub was free to enter the opening in the top of the jaw. Bushings are used for filling the extra space in the lower arm of the jaw. The steering gear has been improved by increasing the strength and size of all its parts. It is a worm and pinion gear, and is supported on the bedplate which carries the magneto. Pronounced improvement is that the draglink B is carried high and outside of the frame, so that it parallels the side member, thereby occupying a position of safety.

LE MOON AXLE

Illustrated are two views of the LeMoon clutch, which is used as a substitute for the differential gear in motor cars, the claims advanced for it being that as it transmits power through the slow-moving wheel when turning a corner the skidding of the car is largely eliminated. The construction of the LeMoon clutches—for it must be remembered there is one in each rear wheel—consists of a star piece B keyed to the driveshaft A of the axle. The end of each star piece carries a roller C, which bears upon an arc segment C of an expander D, which expander is forced outwards against the drum F on the rear wheel, thereby locking the axle A to the road wheel. The expander D is made in three sections, with springs E separating them, these springs serving to disengage when the clutch releases. The spoke of the wheel is designated W, and the wheel, loose on the driveshaft A, is only connected thereto when the expander D engages with the drum F. The driveshaft A extends from end to end of each axle and carries a starpiece B on each end. Whether going straight or turning corners the axle and both starpieces revolve at the same speed. When driving on the straightaway, the rollers C in their efforts to revolve, attempt to climb the curvature of the arc of the expander D, thereby expanding D and locking it to the wheel and rotating it. Should a corner have to be turned, the outer wheel is compelled to travel faster than the starpiece B, and so runs away, as it were, with the expander D until the rollers C are in the middle of the arc, at which point there is no engagement between the clutch D and the drum F, and at which time the inside wheel is carrying the car around the corner. When the corner is rounded and the roadwheels take up an even speed of rotation, the clutch operates and the drive through both wheels is resumed. The reason this LeMoon clutch is claimed to reduce skidding is that the inner wheel drives when turning the corner. To explain: A car starts turning to the left, and if the outer wheel does the driving, its tendency is to keep moving in a straight line, irrespective of the turn made by the front wheels, and this tendency to drive in the straight course results in the skidding. When the inner wheel drives, it also tends to follow the straight line or direction the car was following before the turn, but its line of push is practically through the center of the car. It is this feature that Inventor LeMoon attaches so much importance to, and to which he claims remarkable freedom from slipping of cars equipped with his clutches. Motor Age hopes in the near future to make comprehensive tests of this wheel, and its readers doubtless will hear of its anti-skidding qualities. Dr. J. R. Pennington, 103 State street, Chicago, who is exploiting the merits of the wheel, claims to have given some most satisfactory exhibitions of its work since he became interested in the device.

LE MOON AXLE CLUTCH IN POSITION

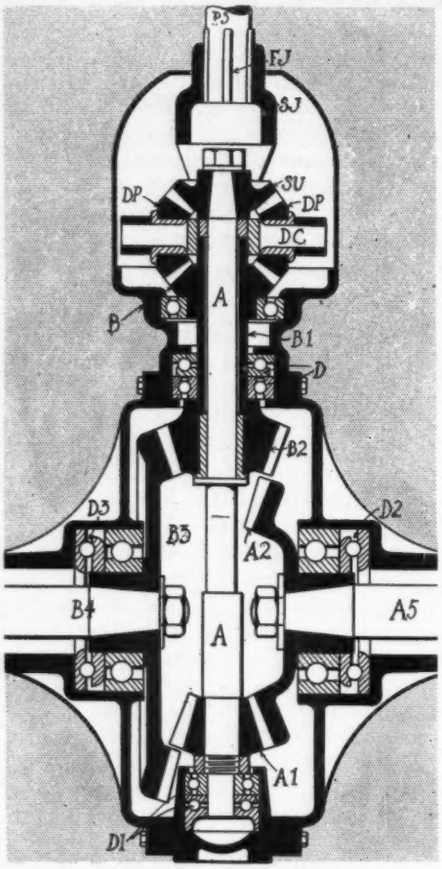


TWO SECTIONS OF STEARNS TWO-JET CARBURETER

Development Briefs

REAR AXLE NOVELTY

One of the novelties shown at some of the recent continental exhibitions is the S. C. A. T. axle, in which the differential is removed from the axle and carried in the drive-shaft from the motor. Newton & Bennett, Manchester, England, who are connected with the selling of the device, urge the claim that placing it in the driveshaft permits of a stronger rear-axle construction, as well as providing increased clearance for the axle. The propeller shaft PS from the motor is feathered at its rear end FJ for sliding purposes in the universal joint SJ, this joint coupling with the differential cage. In the differential proper is a bevel gear SU, a taper fit on the end of the shaft A, which shaft extends rearward, carrying a bevel A1 en mesh with the larger bevel A2, that is a taper fit on the end of the driveshaft, A3, coupling with the right rear wheel. Another bevel pinion B is carried on a sleeve B1, which has on its rear end a bevel B2, meshing with a large bevel gear B3, which is a taper fit, on the end of the driveshaft B4, which drives the left rear wheel. The differential pinions DP, two of which are shown, are carried on a cross DC, and are of conventional construction. In operation, when the car is traveling straight ahead, the bevel SU on the shaft A and the bevel B on the sleeve B1 revolve at the same speed, and drive the axle shafts A3 and B4 at the same rotation, which is accomplished by making the pinion B2 larger than A1, so as to accommodate them to their respective bevel gears B3 and A2, which are of unequal size, due to the design. When the wheels of the car revolve at different speeds, such as when turning a corner, the balancing effect is set up by the planet pinions DB in the identical fashion as if they were in the rear axle, but at which time the shaft A revolves either slower or faster than the sleeve B1. One of the interesting parts in connection with this design is that the thrust between the bevels B2 and B3, is counteracted by the opposite thrust between the bevels A1 and A2, and by carrying the shaft A on annular bearings D and D1, at the front and rear respectively, the further alignment of the shaft A and the meshing of the bevels, is assured. End thrust ball bearings are used at the points D and D1, and also D2 and D3. Another claimed advantage of this axle construction is that the shafts B4 and A3 can be arched, thereby giving the rear wheels the same camber as the front wheels.



Section of S. C. A. T. Axle

IMPROVED FRONT SPRING

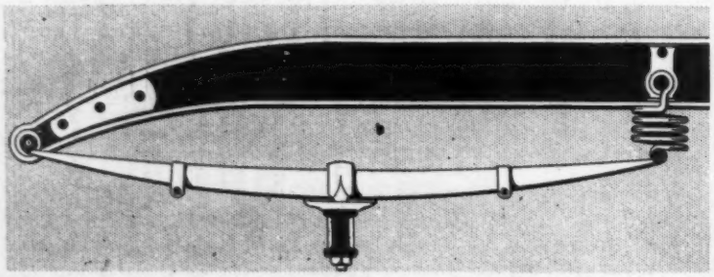
With a view of shortening the length of a forward semi-elliptic spring for motor cars, as well as increasing the range of action of the spring, the Triple Action Spring Co., of Chicago, has brought out a special spring with a little larger arch than ordinary and with a flat coil spring interposed between the rear end of the spring and the frame. The lower eye of the coil takes the eye of the spring on one side, whereas the upper eye of the coil attaches to the frame on the opposite side, thereby placing the coil equally on both sides, which is claimed to prevent side motion. The makers assert the value of this coil is equivalent to 6 inches of spring length. The spring has been tested for a considerable time. It has been styled the type 10 by the company.

FOR VARIOUS USES

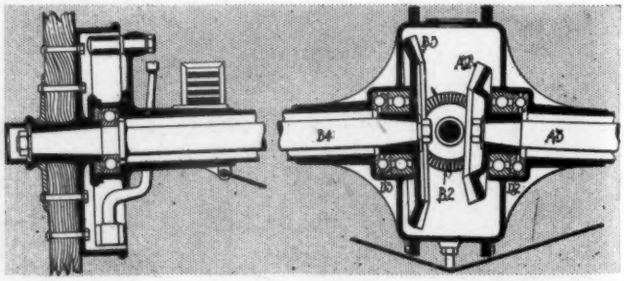
The Mechanical and Electrical Mfg. Co., of Chicago, markets a pair of useful accessories. One, its Triumph valve remover—which consists of a straight handle part with a jaw ending and a slotted swinging seat in the jaw, and a serrated standard, which acts as a fulcrum for the remover—is adapted to rest on the top of the crankcase and the handle portion to fulcrum in any of the serrations. In removing a valve the swinging seat is placed beneath the washer on which the valve spring rests, and the standard resting on the crankcase. It is only necessary to press down on the outer bend of the handle, thereby compressing the valve spring and removing the key which holds the valve washer or seating. The second device is an adjustable ball joint for spark and throttle levers on the steering wheel of a car. These ball joints allow of mounting the levers at any angle best suited to the driver.

The Quick Tire wrench, for removing lugs on motor car wheels, and which is manufactured by John Kelly, Chicago, is a hexagonal wrench part, together with a spool portion around which can be wound a string. Pulling the string turns the wrench. The string is wound right-handed to apply the lug cap and left-handed to remove it.

The Garage Equipment Co., Milwaukee, Wis., manufactures the Perfect mud hook, which is a transverse clip that fits over the thread of the tires and is anchored thereto by a pair of straps passing around the rim of the wheel. Each hook is made of malleable iron and any number can be put on a wheel; for example, one between each two spokes, or less frequent if desired. They can be attached when the tire is in the mud.

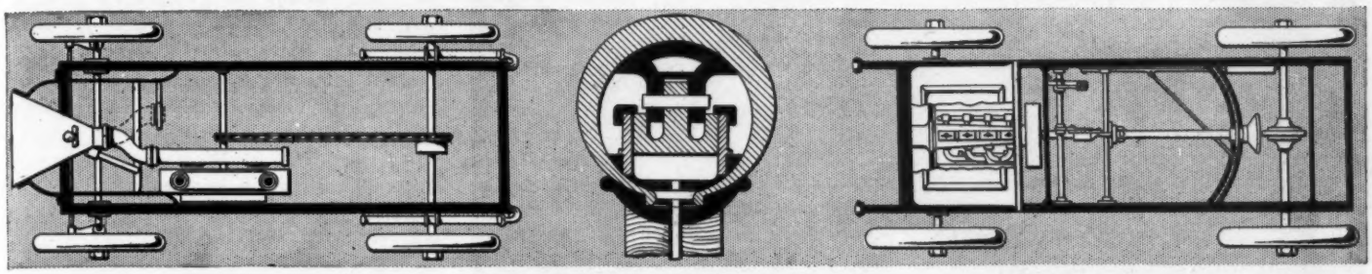


Triple Action Type 10, Latest Front Spring



Sections of S. C. A. T. Rear Axle

Current Motor Car Patents



JOHNSON'S AIR-COOLING SCHEME

SCHIRMER'S TIRE

HALSEY'S FRICTION TRANSMISSION

Two-Cycle Engine—No. 880,704, dated March 3; to M. L. Wood, Montpelier, Vt.—In a two-cycle engine with two cylinders means are arranged for supplying the fuel charge to each cylinder, together with a piston in each cylinder which forces the charge from such cylinder to the adjacent cylinder, this piston having a hollow interior in which the fuel charge is received and compressed. The piston is a double-diameter affair, the smaller diameter part being less than the diameter of the cylinder, but serving to form a pumping chamber at the side of the cylinder adjacent to the other cylinder, so that the large diameter part serves as a pumping piston to force the mixture into the next cylinder.

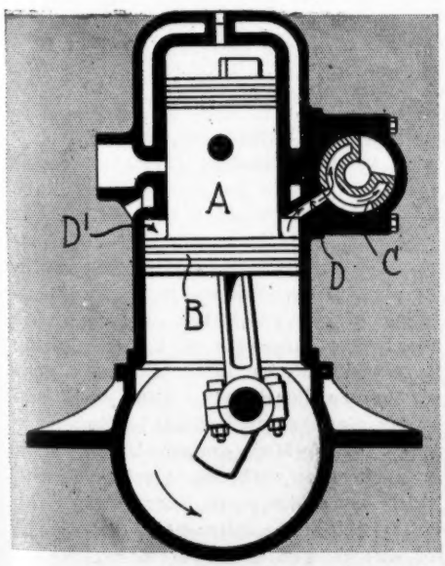
Friction Drive—No. 880,732, dated March 3; to E. R. Halsey, South Orange, N. J.—Novel in connection with the friction transmission system is that it consists of but two friction members, a disk on the rear end of the driveshaft and a friction wheel spanning the differential on the rear axle. The propeller shaft from the motor carries a universal joint at its forward end and takes at the rear the disk already referred to, but also has a crescent-shaped guide and support crossing the frame, which allows of moving the disk from right to left, so its face moves across the friction wheel, thereby giving different variations of forward speeds and reverse. Means are provided through a sleeve member with ball bearings for moving the disk longitudinally in order to allow of moving it on the guide, then forcing it back on the wheel so that sufficient driving contact is obtained.

Air-Cooling—No. 880,739, dated March 3; to M. M. Johnson, Clay Center, Neb.—The inventor carries on the front of the chassis a trumpet-shaped air passage which is continued to the motor airjackets, so that, as the car drives ahead the large opening of the air passage directs a swift current of air into the cylinder jackets. Combined in this air system is a series of valves whereby the air can be admitted to whatever part of the motor desired, and other valves are arranged whereby the cooling draft can be directed upon other portions of the chassis machinery. A lighting system is combined with the cooling funnel, consisting of reflecting plates lining the funnel, and the positioning of a light in the funnel so that the reflectors direct the rays ahead of the car.

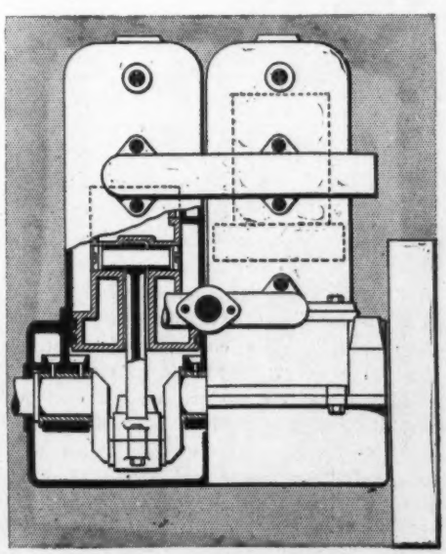
Cushion Tire—No. 880,923, dated March 3; to B. F. Schirmer, Indianapolis, Ind.—This tire has an outer casing which attaches by a clincher style of lips with the wheel rim, inside of the tire instead of the conventional air chamber is a series of radial cylinders, within each of which is a piston. Pivoted to the top of this piston is a crescent-shaped piece which fits within the curvature of the tread portion of the outer casing. The bottom of the cylinder communicates by a small passage with an annual air space in the wheel rim, so when the air is expelled from the cylinders in that portion of the tire closest to the ground, it passes through this air chamber and into other cylinders in that part of the tire above the axle. It will be seen that the annular air space in the rim connects with all the cylinders of the tire, so as the air is forced out of one cylinder by compression it passes into others, thereby maintaining a condition of equilibrium throughout the entire tire.

Revolving Valve.—No. 880,958, dated March 3; to F. X. Bachle and J. C. L. Krebs, Clyde, O.—In the two-cycle cylinder the patented parts consist of a piston of working diameter A and pumping diameter B, together with a rotating distributing valve C, carried in a compartment at the side of the piston and geared to rotate in predetermined relation with the crankshaft. This rotating valve C is so designed as to admit mixture from the carbureter through the passage D into the pumping chamber D1 on the downstroke of the piston, and on the upstroke to conduct the mixture from the pumping chamber D1 through bypasses, not shown in the illustration, into the combustion chamber of the motor above piston A.

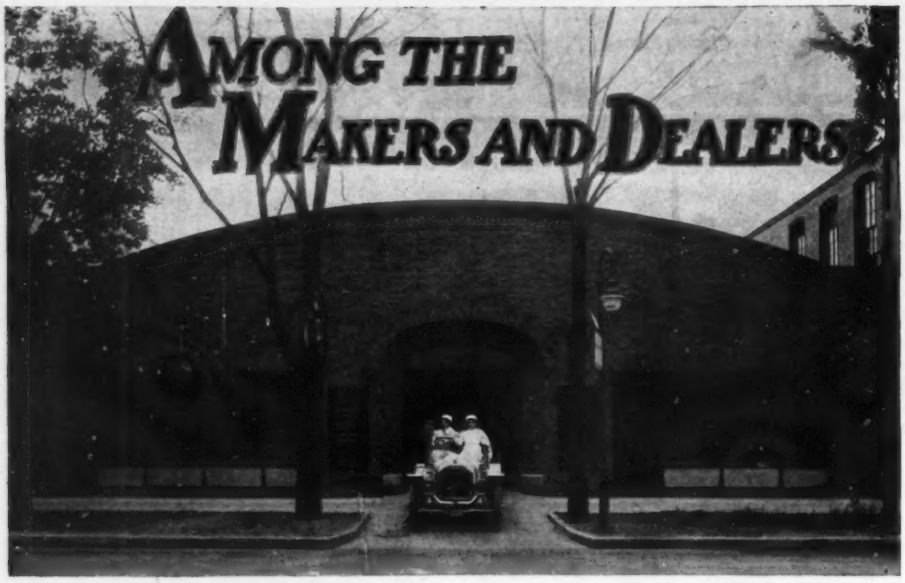
Lock Nut—No. 880,939, dated March 3; to J. E. Virgo, Bridgeport, Conn.—The end of the bolt is prolonged with a reduced diameter beyond the threaded portion and carries a lug; a sheet metal locking cap fits over the nut and has an integral cup portion for fitting over the lug, so the cup thereby securely locks the nut and bolt together.



BACHLE'S REVOLVING VALVE



WOOD'S TWO-CYCLE MOTOR



TWENTIETH CENTURY GARAGE AT SOUTH BEND, WHERE SHOW WILL BE HELD

Opens Downtown Store—The Post & Lester Co. of Hartford, Conn., has opened a downtown retail store on Asylum street, in the heart of the business district.

Jordan Recovers—The Jordan Automobile Co., of Minneapolis, which went into a receiver's hands last November, has satisfied its creditors, it is announced, and the receiver has been discharged. The Jordan company has reopened at 217 Fourth street, south, and will handle the Franklin.

New Wind Shield—The Automobile Special Co., of 602 Maryland avenue, Pittsburg, has placed on the market a new wind shield. It is said to be practically indestructible, the rubber ball and socket joints making it noiseless and nonvibrating, it is claimed. Another feature is that the glass is so fitted into the frame any one can put in a new piece in 10 minutes.

Working Two Shifts—The Kiblinger Auto Buggy Co. is running day and night at its plant at Auburn, Ind. The increasing business of this concern compelled the management to increase its working force. Ever since this motor buggy has been on the market there has been an increasing demand for the product of the factory and at no time has the management been able to fill orders at all promptly, it asserts. It is hoped that by working two forces the situation will be somewhat relieved.

Making Engines—The International Motor Co., of Detroit, has been incorporated with a capital stock of $50,000, and will engage in the manufacture of the Claus motor. The company has bought the property at 868-890 Military avenue, and is installing modern machinery. At first it will manufacture motors for use in launches, but later on the motor will be adapted for motor cars. X. B. Konkel is to be the president of the company, Philip S. Claus, vice-president and general manager; Alex. Lemke, treasurer, and John Lesinaki, secretary. Mr. Claus, who is the inventor of the motor, formerly was connected with the Northern company and more recently acted as assistant superintendent of the Cadillac plant.

Addition to Chicago's Row—Charles A. Bebber, Jr., formerly a partner in the North Side Vulcanizer concern, has taken quarters at 331 Michigan avenue, Chicago, where he will carry on a general tire repair business and also deal in tires and accessories.

Shoemaker a Bankrupt—It is announced that C. C. Shoemaker, president of the Shoemaker Automobile Co., of Freeport, Ill., has been forced into involuntary bankruptcy and that T. H. Hollister has been named as receiver. Shoemaker's liabilities are said to be $50,000, while his assets are unknown. Shoemaker had planned to move to Elkhart, Ind., but that end of his business has been in the hands of a receiver for some time, Wilson Roose having been named.

Starts Delivery Service—The O. K. Automobile Passenger and Package Delivery is the title of a new concern which has started business in Greensburg, Pa., 20 miles east of Pittsburg. The proprietors are A. O. Hunt and S. M. Steele, both of Greensburg, Pa. They are establishing their headquarters on Brandon street. In addition to carrying passengers to and from all the railroad stations, they are arranging a package delivery service for all the merchants of Greensburg, Pa.

Factory at Capital—The American Pneumatic Hub and Wheel Co., recently incorporated by a number of capitalists of Washington, D. C., is seeking a site near that city on which to erect a large factory building. The company is capitalized at $50,000 and the officers are: George Howard, president; A. H. Colline, vice-president; Thomas W. Owens, second vice-president; Murray Cobb, secretary. The company has purchased the patent rights to an invention of a new motor car wheel, designed to take the place of the inflated rubber tire. The hub of the wheel is of peculiar design, and the tire used is of the solid rubber type.

Boston Change—George Canterbury, for some years with the Harry Fosdick company in Boston, has accepted a position with the J. W. Bowman Company, which handles the Stevens-Duryea cars.

New Pittsburg Concern—John Urban proposes to erect a large garage at the corner of Beatty and Mignonette streets, Pittsburg. The establishment will be conducted by Urban & Peebles.

After Earl Plant—Kenosha, Wis., may lose the Earl Motor Car Co. It is said that a number of leading cities in Wisconsin are endeavoring to induce the company to leave the present location. The company is now installed in the building of the Visible Typewriter Co. and has a lease on the location for 1 year.

Handling Aerocar in Gotham—The Hamilton-Kull Co. has been formed in New York and has begun operations at 1677 Broadway as the eastern distributor for the Aerocar Motor Co., of Detroit. Of this company, Douglas Hamilton is treasurer and A. L. Kull is manager. Five cars representing as many models were received Monday at the Broadway salesroom and A. Y. Malcolmson, president of the Aerocar Motor Co. was in town to oversee the unloading of these show cars and demonstrators, and the start of the new company.

Pittsburg Show Plans—Under the directions of Thomas I. Cochran, arrangements for the show to be held at Duquesne gardens, Pittsburg, the first week in April are going ahead rapidly. The decorations at the garden will be by far the most elaborate that have ever been put up there. Eagles with wings spread 8 feet will be used in the ornaments and there also will be wings, large pedestals, ornament shields on the marble pillars and great work throughout. A musical program has been arranged for every day of the show. The smoking room will be fitted up especially for the occasion and a restaurant will be conducted in the building during the week of the show.

Opens New Department—A new department in the marketing of motor cars is announced by the American branch of the Maja company, of which E. B. Gallaher is manager. This is a publication department, which will be a portion of the working plant of the Maja company. The institution of the publication department is largely the outgrowth of the remarkable increase in interest in the European touring bureau instituted a few years ago by Mr. Gallaher, and which has become a portion of the Maja company's equipment. In connection with the touring bureau, which has as its particular functions the supervising of the shipment of cars abroad for owners who desire to make long or short trips to Europe, the providing of

drivers, itineraries, etc., the Maja company has published E. B. Gallaher's Guide Book to European Touring, which will be placed on sale this week.

Show for South Bend—Show enthusiasm has caused the Twentieth Century Motor Car Co., of South Bend, Ind., to determine to hold a show of its own and it has selected March 26, 27 and 28 for its dates. The affair will be held in the company's big garage in that city.

Maxwell Branch Moves—The Maxwell-Briscoe-Pittsburg Co. is now located in its new garage at Forbes street and Meyran avenue, Pittsburg, to which it moved last week from its old quarters at 620 Maryland avenue. William H. Durphy is manager of the branch.

Garage in Burlington, Wis.—Another garage is to be opened up at Burlington, Wis. Agner & Reynolds have leased quarters in the Weygand building and will install the Star garage. The building will be extensively repaired. The company has secured the agency of the Jackson and also will carry a line of supplies. The new garage is expected to be ready by the 1st of April.

Asks for Receiver—An application has been made to the common pleas court of Toledo, O., asking the appointment of a receiver to take charge of the business of the Toledo Autoparts Mfg. Co. The petition was filed by Frank J. Cheney, who owns the building occupied by the company. It is alleged the concern is insolvent and that its assets are liable to be made subject to suits by numerous creditors. Cheney asks judgment for $700 which he says is due under his lease. It is thought the action was instituted as a means of protection from pressing creditors, and to prevent dissipation of assets.

Taking to Business Rig—The outlook for the commercial motor vehicle trade in Indianapolis and vicinity is said to be much better than it was this time last year. Despite the financial depression and panic talk, a number of trucks and delivery wagons have been sold this year. For the first time in the history of the city a determined effort was made all winter to place commercial cars and demonstrations were made in all kinds of weather. The Indianapolis merchant is of the show me type, and where he has been shown an order usually has resulted. One local company alone has placed six trucks within the last few weeks, including a patrol wagon for the police department. On the other hand, the sale of runabouts for commercial purposes has been equally good. Carlin & Lenox, piano dealers, have placed an order for a gasoline truck, and this will be the first concern of its kind in the state to make use of such a vehicle. Schnull & Co., wholesale grocers, also have placed an order for a 1½-ton truck. The Hamilton-Harris Co., a wholesale cigar dealer, has displaced its horse-drawn service with a truck. A. Goyert & Co., Greensburg, have purchased another truck. They are wholesale poultry and produce dealers. Another order has been placed with the same company by G. Twolfe & Co., Theressa, Wis.

Schiller at the Helm—Walter R. Schiller has been secured as general manager of the Electric Garage Co., of Utica, N. Y., for the coming season. Mr. Schiller is not only an electrician, but is also an expert on gas engines of all kinds.

Bus Line in Colorado—A passenger and express motor line to operate between Longmont and Estes Park, Colo., will be established by May 15 by L. C. Larsen and O. P. Lowe, of Longmont. Fully $40,000 has been expended in the last year in putting the road between the two points in first-class condition. J. T. Stanley, of the firm which manufactures the Stanley steamer, is the principal owner of Estes park, one of the noted Colorado resorts, the way to which is through the most magnificent, rugged mountain country in the west.

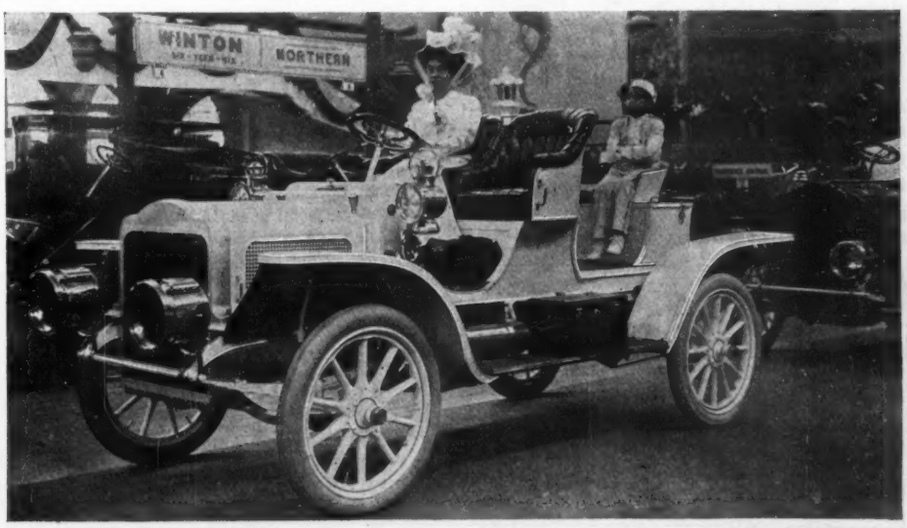
Joy Rider Detected—Cleveland dealers are looking for a smooth young man who fooled half a dozen leading dealers during the past 2 weeks into believing he wanted a car. With a glib tongue and apparently earnest manner he has placed orders for half a dozen cars. His plan of procedure was crafty and cunning. He said his father, who was in the west, desired to purchase a high-powered car. Also a friend of his was coming to town in a week or so and would purchase the same kind of a car he did. The misguided agents worked hard for those sales. Night after night different agents took him for long rides. He had theater parties, dinners and long rides with friends. In nearly every case he actually closed the deal to the extent of signing an order, but found his father was out of town, referring to the western city, and could not be reached by wire. And the agents paid the freight on the telegrams. For nearly 2 weeks he kept this up. But one night, after several demonstrations and theater parties, one agent took it upon himself to hunt up the young man's father and found the respected parent did not live in a western city, but was in Cleveland. He was quick to avow any intention of buying a car and said his son was "only having a little fun."

Leases Garage in Lenox—Oscar R. Hutchinson has leased the Morse garage in Lenox, Mass., and will carry on the business of the late Thomas S. Morse, of that place. Mr. Hutchinson will handle the Pope line.

Takes Regal Agency—The Regal is to be handled in Milwaukee by the Browne-Friend Motor Co., which will handle the Regal in connection with the Mitchell. It will have the state of Wisconsin included in the territory to be covered.

Cab Service at Capital—The Federal Taxicab Co. began a motor cab service in Washington, D. C., Monday, and judging from the way in which the public took the enterprise right off the bat, it is evident the new company will meet with much success. Five Thomas taxicabs were placed in service and five more will be added within another week, to be followed by five more by April 1. R. A. Parke, of the E. R. Thomas company, is manager of the local service and has established headquarters at the salesrooms of the Motor Car Co., Washington agent for the Thomas. Popular prices for the cabs have been established and will serve to boost the enterprise.

Wayne Changes—A financial interest in the Wayne Automobile Co., of Detroit, has been secured by B. F. Everitt, W. E. Flanders, Thomas Walburn and a group of Detroit capitalists, and as a result there has been a change in the Wayne administration whereby Mr. Everitt becomes president and Mr. Flanders general manager. The latter formerly was general factory manager for the Ford Motor Co., but resigned, as did Mr. Walburn, who was general superintendent of the Ford plant, in order to go in with the Wayne. It is the intention of the reorganized Wayne company to add a large quantity of special machinery to its plant, which already comprises 100,000 feet of floor space.

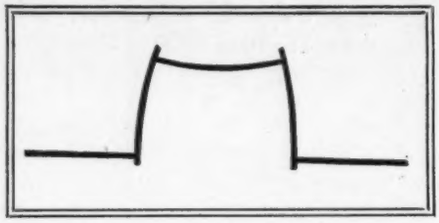


ATTRACTION AT WHITE STEAMER STAND AT THE BOSTON SHOW

CRANKSHAFT DESIGN AND CONSTRUCTION

THE crankshaft of the motor of a modern car is at once one of the most expensive single pieces that enter into the whole construction, and a part that requires the greatest skill of the machinist's art for its proper execution. The crankshaft is an old mechanism, having been in use for more than a century on steam-engines, but the problem of the multiple crankshaft for high-speed internal combustion engines is a relatively new one. The abolition of the crankshaft in engines is a hobby with numerous inventors, and during the 10 years of the writer's connection with the motor car industry, numerous crankless engines have been brought to his attention. I am inclined to think, however, that a principle of construction which has withstood the test of time for more than a century must have unusual merits.

In the design of a crankshaft the first requisite is that it must be strong enough to resist or withstand the stresses to which it is subjected in operation. These stresses are of a very variable and complex nature and almost impossible to determine from theoretical considerations alone. Of course, it is only necessary to consider the maximum stresses for any given portion of the shaft. On the crankpin there is evidently a bending stress which is at a maximum at the moment the explosion occurs. The crank arms are subjected to compound stresses, viz., a bending stress in the plane of the crank and a bending stress in a plane at right angles to the crank. To better understand the first of these stresses, we may consider the crank stationary in the top dead center position; when the explosion occurs the pin and the crank arms will flex, somewhat similarly as when a load is applied to a beam fixedly supported at its two ends. The flexure in actual work is, of course, infinitesimal, but we may obtain an idea of the general shape the parts assume by considering a shaft of very small cross-sections and long members. When such a crank is subjected to a load corresponding in direction to the pressure of explosion, the crank members will assume approximately the form shown in the first cut. I have here assumed that the two shaft journals are held rigidly, while the crankpin is capable of bending. This assumption has some justification because the crankpin bearing is often much shorter than the main bearing. This illustration gives a good idea of the localization of stresses at the joint between the crank arms and the main journals. It is at this point that practically all breaks of crankshafts occur. To minimize the danger of breakage here very liberal fillets should be provided. The crank arms act as lever arms for turning the shaft and as such are subjected to bending stresses which increase from the joint with the crankpin to the joint with the main journal. The main journal, finally, is subjected mainly to torsional stresses.



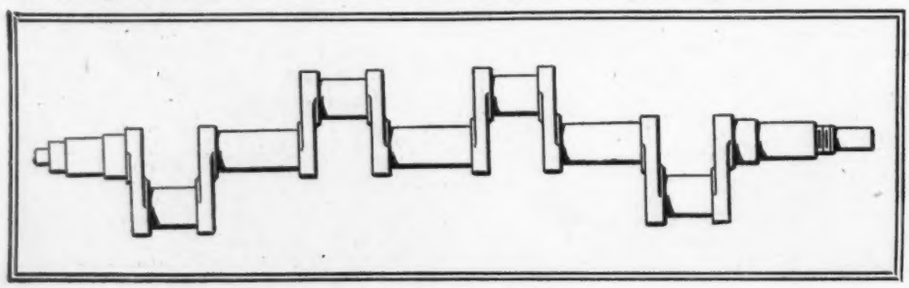
STRESSES ON CRANK MEMBERS

The crankshaft must be designed to withstand these stresses, and yet must be no larger than necessary, because this would mean not only an amount of dead weight would have to be carried but that—if the journals were of more than the necessary diameter—the friction loss would be greater than need be. In spite of the fact that there are thus two distinct reasons for keeping down the size of the crankshaft, I do not believe that too much peeling here is advisable. It has been said—and I believe is the general opinion among engineers—that every crankshaft breaks in the course of time, its lease of life depending upon the character of its material and the maximum stress regularly sustained at any point. Experiments with so-called endurance machines have shown that the number of repetitions of stress which a part will withstand is directly dependent upon the value of the stress as compared with the breaking strength of the material; in other words, upon the factor of safety. Now, the aim in crankshaft construction should be to make the maximum unit stress so low that the endurance of the crank equals the normal lease of life of the motor. Breakage of a crankshaft while the motor is still in good working condition will always be regarded by the owner as proof of improper design or poor material, while there is, of course, no advantage in endurance much beyond the normal lease of life of the motor. But this endurance is not subject to exact calculation and it is far better to err on the side of safety in proportioning the crankshaft. This policy of making the shaft considerably heavier than would seem necessary is followed by the German Daimler company at least in some of its models.

In the production of crankshafts a number of entirely different processes are followed. In some of the old style marine and small stationary motors are found crankshafts which are produced from a piece of machinery steel which has a kink put into it by a steam hammer to serve as the crank, and then has the pin and main journals turned up in the lathe. The manufacturers of these motors claim the advantage that in these shafts the grain runs lengthwise of the shaft. This latter point cannot be advanced in favor of the crankshafts used in the majority of modern high-grade, four-cylinder motors. These shafts are made from solid prismatic slabs of metal of the same dimensions as the over-all dimensions of the completed shaft. "Whittling" a shaft out of such a block of metal entails an enormous amount of machine work and comes very expensive, but is thought to be justified by the very superior metal thus obtained in the finished shaft. The "grain" argument in favor of crankshafts forged to shape as against those turned from solid slabs has probably very little weight because metallurgists are now generally leaning toward the opinion that steel is not fibrous at all, but is naturally of a crystalline structure and as strong in one direction as in another. Many crankshafts of modern engines are made from drop forgings and hydraulic forgings, and the advantages of this method of construction is that it greatly reduces the amount of machine work that must be done upon the shaft. In the case of crankshafts for low-priced cars it is the custom to leave the crank arms of drop forged crankshafts in the rough and only finish the journals. It is really hard to see what advantage there is in finishing the crank arms, except that a crank so finished looks better, but as the crank of a motor car engine can only be seen when the motor is taken apart for repairs, this feature seems to benefit only the repair man. Of course, a crankshaft made from a slab must have its arms machine finished.

The materials most largely used for motor car crankshafts are carbon steel of from 35 to 50 points carbon, nickel steel, nickel chrome steel and vanadium steel. Formerly it was the custom in France, I

EDITOR'S NOTE—The following paper on the "Design and Construction of Crankshafts" was read by P. M. Heldt at the meeting of the Society of Automobile Engineers last week.



FIVE-BEARING TYPE OF CRANKSHAFT

understand, to caseharden the crankshaft journals and grind them. This treatment undoubtedly improves the bearing properties of the steel. The casehardening process has now been given up and instead the shaft is subjected to a heat treatment. In some cases this treatment consists in raising the shaft to a temperature of about 900 degrees centigrade, quenching it in oil and then reheating it slowly to 500 degrees centigrade. This treatment is given the shaft after it has been roughed out, for the reason that it hardens the metal and renders the removal of more material difficult.

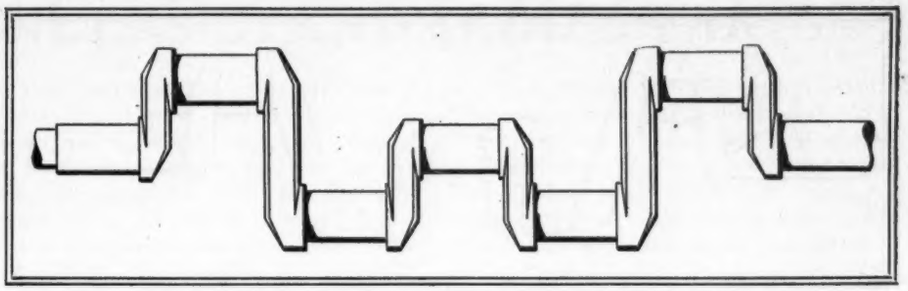
The treatment giving the best results depends, of course, entirely on the particular grade of steel used, and the subject of the different available steels is so vast that it can be only referred to in passing. Whatever grade of steel is used, however, it is essential that it be derived from very pure ingredients and that the sulphur and phosphorus components be as low as possible.

Perhaps the most interesting phase of crankshaft design to the motor car engineer is that of the proportioning of the parts from the pressures and stresses developed in the engine on the one hand and the strength of the material, generally recommended by a metallurgical engineer, on the other. The method of calculation is necessarily different for different forms of crankshafts.

For the purpose of this discussion we may divide the different single-piece shafts used in motor car engines into four groups, with one, two, three and four throws between main bearings respectively. The first two of these groups are by far the most common; that type with three throws between main bearings has been used on some small experimental triple-cylinder engines, while the last type with four throws between main bearings is now coming into use for taxicab or block engines.

It is at once apparent that in a crankshaft with a main bearing between each pair of throws or at both sides of the crank there is little chance for heavy bending stresses to occur, provided the bearings are rigidly supported by the crank chamber or base. In a crankshaft with a double throw between main bearings, the bending moment is already a much more important factor because of the greater relative distance between supports. In a crankshaft with four throws between the main bearings the bending moments become a factor of extreme importance.

In a crankshaft of the first type the length of the crankpin and main bearings is limited, and for a certain size of cylinder bore and an average compression figure the crankpin must be of a certain diameter if the specific pressure on the bearing surface is not to exceed the maximum permissible value. If both the diameter and the effective length of the pin



CRANKSHAFT WITH TWO THROWS BETWEEN BEARINGS

are made directly proportional to the cylinder bore, the projected area of the pin bearings will be proportional to the piston area and consequently to the maximum pressure that it will have to support. Some years ago I gathered data of the crankshafts of a large number of American, single-cylinder crankshafts, practically all of ordinary carbon steel and made by the drop forging process. I found that the average proportions were:

Pin diameter = .3 × bore
Pin length = .42 × bore
Width of crank-arm = 1.4 × pin diameter
Thickness of crank-arm = .5 × pin diameter

The material used in these shafts had perhaps an average tensile strength of 65,000-70,000 pounds. If alloy steels of 105,000 to 125,000 pounds tensile strength were substituted the proportions could be materially changed. The crankpin could be made somewhat longer and of smaller diameter, and the arms could be reduced in size in both directions of their cross-sections.

A close calculation of crankshaft dimensions should, of course, take into account both the maximum pressure developed in the cylinder and the tensile strength or elastic limit of the material. It is evident that in a crank with double throws between bearings the crankpins must be larger in diameter than in a crank with only a single throw between the bearings, of the same material and for the same size of cylinder. The long crank arm in the former case also must be considerably heavier than the short crank arms. From comparatively recent data of a considerable number of four-cylinder crankshafts with double throws between main bearings, I have reached the conclusion that in average practice the pin diameter in such cranks is

$$d = .4\sqrt[4]{\frac{P^2}{S}},$$

where P is the maximum pressure on the crankshaft material. For a crankshaft piston and S the tensile strength of the with only a single throw between main bearings the formula becomes

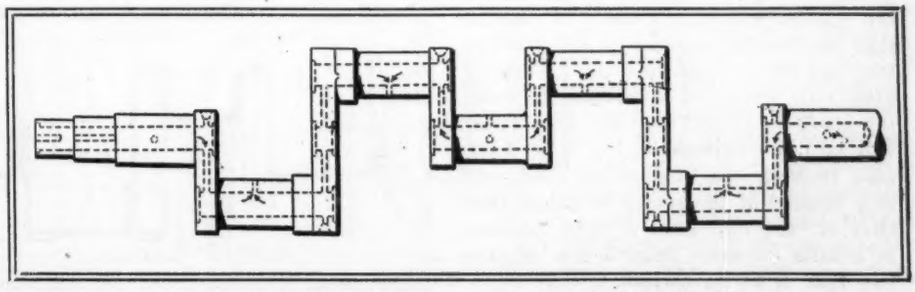
$$d = .38\sqrt[4]{\frac{P^2}{S}}$$

The coefficients .4 and .38 may seem so close together that the difference is not worth talking about, but it must be remembered that the strength of a crankpin is proportional to the cube of its diameter, and the former formula gives a pin about 17 per cent stronger than the latter. The length of the crankpin can be found from the permissible unit bearing pressure and the bearing diameter thus determined. In a crank with two throws between main bearings there is no reason why the bearings should not be made comparatively long, as there is plenty of room, and the unit bearing pressure may be limited to 1,200 pounds per square inch. In the other type of crank the space is limited and the unit pressure on the crankpin bearing surface must be carried somewhat higher, 1,500 pounds per square inch being an average figure.

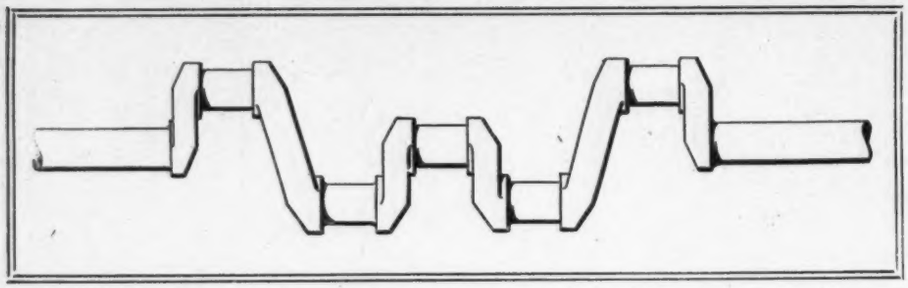
The proper diameter of the main journals is, of course, the same for all types of crankshafts. The resistance to torsion of the main journal must be proportional to the maximum pressure on the piston and to the length of the stroke. I have found the following formula to express very closely the average practice in dimensioning the main journals:

$$d = 2.6\sqrt[3]{\frac{s\,P}{S}}$$

In proportioning the crank arms it is usual to make the width somewhat greater than the crankpin and main journal diameters in order that it may provide a shoulder for the bearings, the average width being w=4/3× crank-journal diameter. When this width is used the average



THREE-BEARING CRANKSHAFT DRILLED FOR LUBRICATION



A VARIATION OF THE THREE-BEARING TYPE OF CRANKSHAFT

thickness of short crank arms is given by the formula

$$t=\frac{d^3}{w^2}$$

and that for long crank arms by the formula

$$t=.72\sqrt[2]{\frac{d^3}{w}}$$

This practice of making the crank arms equal in width to the crankshaft diameter plus about twice the height of the flanges on the ends of the journal sleeves is a heritage from the period of single-cylinder engines. There can be little doubt that in a crankshaft with two or more throws between main bearings advantages in the way of lightness and strength could be secured by making at least the long arms narrower and of somewhat greater thickness. This idea has been carried out in some crankshafts made of drop forgings and in which the arms remain unfinished. In these shafts the crank arms are forged with segmental prominences on opposite sides of each journal, so as to form a complete circular shoulder the height of the journal sleeve flange. In shafts finished all over it is, of course, impossible to provide these prominences, but it does not seem at all necessary that there should be a continuous circular shoulder at the end of each journal, as, unless no provision is made to take the end thrust of the clutch up within the clutch itself, there is little end pressure on the crankshaft bearings.

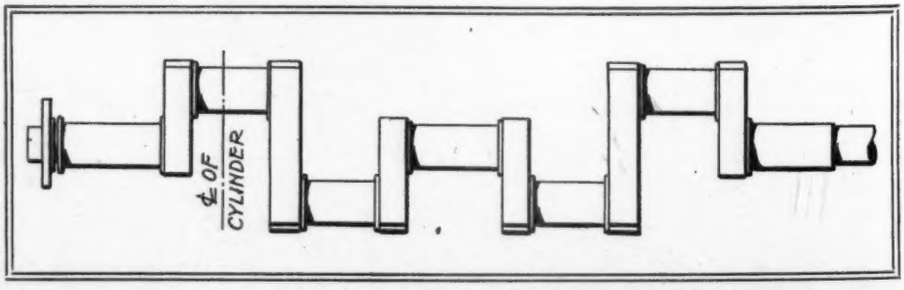
Certainly the most striking and daring innovation in crankshaft design is the four-cylinder crankshaft with only two main bearings, as used on a number of "block" motors fitted on taxicabs. When one considers that in a single-cylinder engine the average distance between main bearings is only about seven-eighths of the cylinder bore, while in a four-cylinder "block" engine with only two main crank bearings it is at least four times the cylinder bore, it can easily be realized that the bending moment on the shaft at the moment of explosion is relatively great. Of course, it is possible to make the shaft so heavy that the unit stress will be quite reasonable, but it is desirable to keep the dimensions down, not only because of the saving in weight thus effected, but also because with journals of smaller diameter there is less friction loss that is to be noticed.

It is hardly likely that a shaft of this type will be made of carbon steel, with its relatively low elastic limit; nickel steel and chrome nickel steel are undoubtedly essential to stand the strains imposed on a crankshaft of this type for a period of time approaching the life of the engine. It is also obvious that with a crankshaft of this kind considerable bending will occur at the moment of explosion, and care must be taken in the design to insure that there can be no localization of strains from this bending. With only two bearings, if plain or parallel bearings were used, they would necessarily have to be of more than the usual length and the two ends of the shaft would be almost rigidly held, so far as bending is concerned. This would concentrate the strains at the inner ends of the main journals, and the shafts would undoubtedly break at these points in short order. Some form of bearing which permits of some disalignment of the journal portion of the shaft appears to be absolutely necessary. The annular type of ball-bearing fulfils this requirement and seems to be exclusively used for the purpose at present. Some sort of parallel bearing with a spherical seat, as often used on dynamos, might possibly also be made to serve the purpose, but would hardly be as good as the ball-bearing. Localization of strains at the ends of crankshaft journals is also a serious matter in crankshafts with fewer than four throws between supports, and probably a majority of all crankshaft breaks occur at these points. That this danger must be guarded against by providing fillets of large radius at the junction of journal and crank arm can be read in almost every article on crankshafts, but is one of those important rules of design that will bear repetition.

One of the illustrations herewith shows the crankshaft of the Delahaye 12-16-horsepower block motor, which is probably typical of this design of crankshaft. In studying the layout of this shaft it will be observed that it is not in perfect mechanical balance, there being nothing below the center line of the shaft in the drawing to balance the two short crank arms extending upward. It would, of course, be an easy matter to secure counterweights to these outer crank arms, but in the writer's opinion a more advantageous plan would be to increase the cross-section toward the middle of the shaft. The two long crank arms would then be slightly tapered from one end toward the other, and the two middle crankpins would be of larger diameter than the two outer ones. This latter feature, necessitating two different designs of connecting rod bearings, and possibly of connecting rods, would be the reverse of an advantage, but otherwise the construction would have at least two advantages. The bending moment in a structure like this increases from the ends towards the middle, and in order to reduce the unit stress to a minimum, with a given weight of metal, the section must increase from the ends towards the middle. Further, if the two inner crankpins are heavier than the two outer ones and the long crank arms taper from the inner crankpins down to the outer ones, the crankshaft might be made to balance without extra balance weights.

In connection with the question of balancing four-cylinder crankshafts, the point is sometimes made that if cranks extending in opposite directions from the shaft and located at some distance from one another in the lengthwise direction of the shaft are depended upon to balance or neutralize one another's centrifugal and inertia effects, this can only be accomplished at the expense of internal strains in the shaft, and it is contended that the only proper way to balance a four-cylinder shaft is to provide each short crank arm with a counterweight extending in the opposite direction. This idea is carried out in at least one French engine. The writer believes it to be an illusory refinement, as the increase in weight is a much greater detriment than the strain on the shaft due to the balancing effect of sidewardly displaced opposite cranks.

If the four-cylinder, two-bearing crankshaft should prove a permanent success it would mean an important simplification in engine construction. Doing away with the standards for intermediate bearings, and with these bearings themselves, it would lead to a considerable saving in the weight of the crank case.



THREE-BEARING CRANKSHAFT WITH CYLINDERS OFFSET LONGITUDINALLY

A. L. A. M. ENGINEERS STANDARDIZE PARTS

NEW YORK, March 14—The meeting of the mechanical branch of the Association of Licensed Automobile Manufacturers, held Tuesday, being the first held this year, many subjects, which special committees have been experimenting on and investigating in were reported, and papers read to the members. A special committee appointed to work with the test committee toward the standardization of rod and yoke ends, made an elaborate report on what it considered the proper sizes for the standardization of these important parts of construction. Standards for ⅜, 7/16, ½ and 9/16 rods were adopted and will be known as the A. L. A. M. standard adjustable rod and yoke ends. Nearly every manufacturer of American cars is, at the present time, using various sizes of rods and yoke ends and it was found that owing to the various sizes used that there was considerable confusion in getting the proper sizes for immediate delivery. With the adoption of this standard, the manufacturers of rods and yoke ends will carry in stock a full line of the standards adopted so users of the sizes which have been adopted may be able to buy in the open market such sizes necessary. This is of particular benefit to the user, as the parts will be interchangeable, and the rods of one car will do for another.

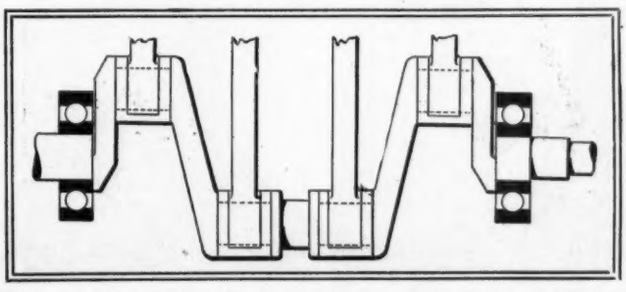
Another important standardization was that of levers. Various weights and sizes of levers have been used with a considerable expense to those car manufacturers who do not have drop forging plants. Owing to their inability to buy stock levers, they must necessarily buy the dies from which these forgings were made and with the changing of the type or weight of the lever, new dies, at an increased expense, are necessary. After careful consideration the branch adopted a uniform modified I-beam lever, which the drop forge makers will carry in stock, making these levers interchangeable.

The committee appointed to report on the standardization of rims felt the time was not ripe for a universal adoption of the standard rim, owing to the fact that it was impossible to tell whether the clincher or demountable rim would be in vogue. The use of spare wheels instead of demountable rims was given consideration and the rim committee empowered to make a further investigation.

At the afternoon session, Dr. Charles Edward Lucke, of Columbia university, who has been making some exhaustive tests with alcohol as a fuel for internal combustion engines, delivered an address to the members. Dr. Lucke's remarks were principally in making comparisons in the tests he had made with the use of alcohol for gas engines for locomotion as compared with those for stationary use. He pointed out clearly to the branch that with certain types of engines he could start with alcohol as easily as gasoline by the use of a spray carbureter with the ordinary needle valve. He said he did not feel the time was opportune for a universal adoption of alcohol for practical use, especially in motor car engines, owing to the absolute necessity for a minute adjustment of carbureter and ignition which could not be had in motor cars owing to the inexperience of many drivers and owners. The vagaries of alcohol as a fuel was clearly pointed out by Dr. Lucke, who explained that during his experiments conditions arose and developed to an amusing standpoint. One incident noted was that in his tests on a two-cycle motor with crankcase compression, he found the excess vapor which had not exploded with the first charge on the in-take escaped through the crankshaft and could be ignited. In many instances the vapor could be ignited at the exhaust. In nearly all his tests, however, a good consumption had been attained and the standard of thermal efficiency of the motor maintained by means of this.

E. R. Hewitt, who has been experimenting with alcohol for commercial purposes, gave some data on the results of his work. Mr. Hewitt adapted an engine to the use of alcohol for a 5-ton truck. On gasoline with a full load 4½ miles on a gallon of gasoline could be had. On using the motor without readjustment only over 2 miles per gallon of alcohol could be gotten, but on raising the compression from 75 to 120 pounds, he was able to get more than 5 miles to the gallon of alcohol. He pointed out that it was necessary in this case to place the carbureter as near the engine as possible in order that the mixture would be sent into the cylinder not less than 72 degrees. In cold weather he was able to overcome the loss in the vaporization by surrounding the intake pipes with the waterjackets, which kept an even temperature for the vapor until discharged into the cylinder. It was the consensus of opinion that for commercial work, alcohol in the near future would be the most economical fuel to be used.

A lecture on the use of pyrometers for indicating and recording the heat temperature in treating steel was delivered by W. H. Bristol and Charles Engelhard. The session closed with the annual election of officers. This resulted in a unanimous re-election of the present incumbents, who are A. L. Riker, Locomobile company, chairman; Coker F. Clarkson, secretary; Henry Souther, metallurgist with H. E. Coffin, Thomas-Detroit company, chairman of the test committee.

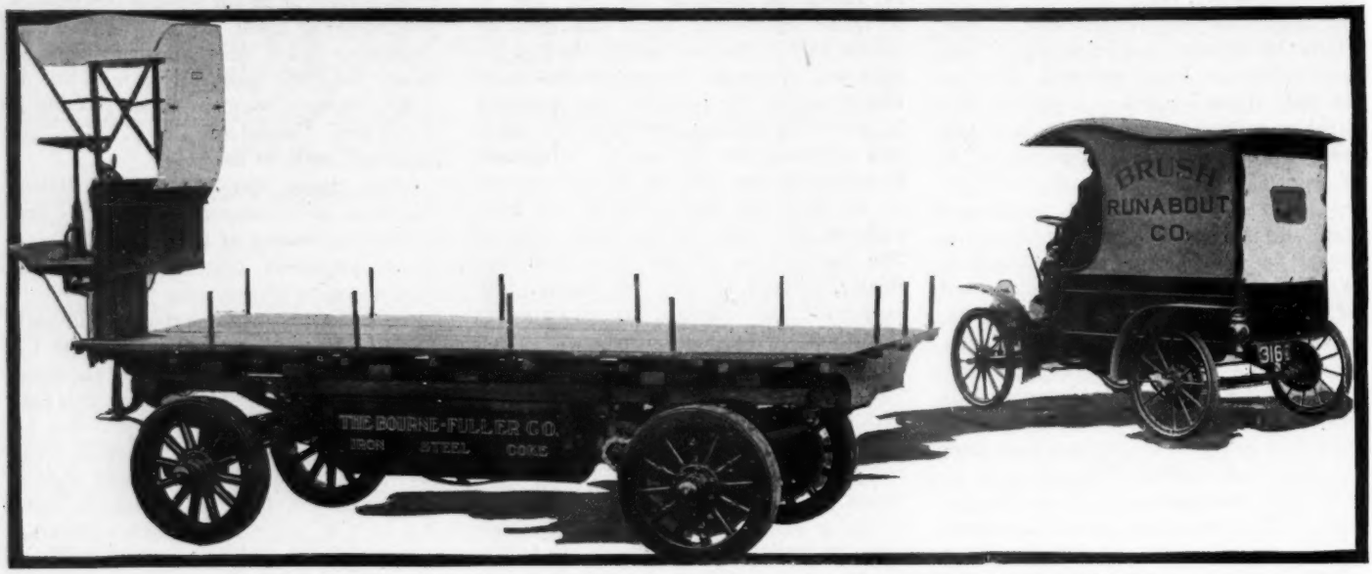


MOST RECENT DEVELOPMENT IN CRANKSHAFT DESIGN

Engineers Meet at the Hub

Boston, Mass., March 14—Though Boston was down as the meeting place of the first quarterly gathering of the Society of Automobile Engineers this year, one of the chief events of the meeting was the run to Lowell, Mass., for the purpose of inspecting the plant of the Heinze Electric Co. and incidentally to partake of a lunch given at the Lowell Country Club, this part of the program having been provided by J. O. Heinze, one of the members. The meeting was opened by President Fay at the Walker building, Massachusetts Institute of Technology, on Tuesday evening, with the reading of a paper entitled "Perfecting Automobile Ignition," by Mr. Heinze. The following morning the members gathered at the headquarters of the Bay State Automobile Association, where cars were waiting to convey them to Lowell. J. O. Heinze, in a Marion runabout, met the visitors in Lowell and piloted them out to the Vesper Country Club, where a luncheon was served to the engineers at Mr. Heinze's invitation. At the conclusion of this, the engineers returned to Lowell and were first taken through the woodworking plant of the Heinze Electric Co. Every detail of the various processes involved in converting the rough lumber into the highly-finished coil boxes was inspected, and then the cars were again taken for the ride to the main plant, where the electrical work is carried on. This contains a most complete equipment of automatic machine tools for the production of the numerous small brass parts found on vibrating coils, winding, assembling and testing rooms, a battery of mercury air pumps for the manufacture of X-ray tubes, and a laboratory. The piece de resistance, so to speak, was the huge induction coil capable of producing a spark 50 inches in length. It is the largest of its kind ever built. The return to Boston was made without incident. At the Bay State Automobile Association's clubrooms in Dartmouth street dinner was served. Professor F. R. Hutton, past president of the A. S. M. E., spoke at length concerning a plan of co-operation by the two societies which was referred to the council of the S. A. E. for further action. The regular business meeting followed this, at which the election held at the annual meeting was ratified and the proposed constitution adopted.

REALM OF THE COMMERCIAL CAR



STUDEBAKER 5-TON PLATFORM ELECTRIC TRUCK AND BRUSH PACKAGE RUNABOUT DELIVERY WAGON

NEW IN TAXIDOM

TO THE growing list of American taxicabs must be added the names of Frayer-Miller and Elmore, one of which is illustrated on these pages. The Oscar Lear Automobile Co., builder of the Frayer-Miller, reports it has received an order for five of these cabs to be used in livery and taxicab work in New York city. The cab carries the regulation 24-horsepower air-cooled Frayer-Miller motor, with cylinders 4 1/8 inches in diameter and 5 1/8-inch stroke. In coupling the motor with the rear axle, care has been exercised in the gear ratio so that the cab can do practically all of the work on the high gear. New in it, however, as compared with other Frayer-Miller cars, is the presence of the Standard Roller Bearing Co.'s three-speed and reverse transmission, which is formed as an integral portion of the rear axle, and which transmission is used on Thomas taxicabs. Making the wheelbase only 100 inches shows the adaptability of the car for street work. Tires are 32 by 4 inches all around. Ignition is by the Attwater-Kent system, in which dry cells are used as current producers. The illustration shows the use of the patented Frayer-Miller fenders, which prevent the throwing of mud on the body work. The interior of the body is finished in leather, with two forward seats, thereby furnishing accommodation for four passengers.

The Elmore taxicabs, which were announced some time ago, have reached completion and are being shipped from the factory as rapidly as assembled, the entire output for the present, however, going to Owen H. Fay, of Chicago, who intends to establish a regular taxicab system in the Windy City. These cabs are built on the regular Elmore 30 chassis, the power plant of which is a three-cylinder two-cycle engine of the valveless type and rated at 24-horsepower, which, through a gear ratio of 3 1/2 to 1 of the rear axle, gives a range of speeds from 4 to 30 miles per hour. The total weight of the cab is 2,300 pounds. In designing the body the aim has been to give as much room as possible, and in this quest the height measures 60 inches and the inside width 40; from the front seat to the back cushion is 45 inches; the door is 22 inches wide and 54 inches high; the distance from the back of the front seat to the rear seat is 27 inches, and the extreme body height from the ground 90 inches. The doors are operated by inside latches. Both the front and door windows are of the drop pattern and manipulated from the inside. The only difference between this chassis and that on the regular car is that the wheelbase has been shortened to 102 inches.

It is not unexpected that with the general introduction of taxicabs in London that stories should be afloat as to how the drivers of these cabs can "beat the instrument" and thereby make money on the side and incidentally overcharge the passengers. One of the theories advanced along this line is that the driver manipulates the taximeter by judicious use of the clutch and brakes, which seems utterly impossible. The idea was that anti-skid devices were fixed to the right rear wheel, whereas the taximeter was driven off the left rear wheel; from this the theorists reason that by letting the clutch in quickly the wheel with the anti-skid on would grip the road, while the other, namely, that driving the taximeter, would idly revolve to the disadvantage of the fare. An examination made by interested parties shows that while on most taxicabs the taximeter is driven from the left rear wheel, it is also the case that the majority of cabs have anti-skids fixed to this wheel also, thereby removing all possibility of cheating the passenger by such methods. The London county council, as a result of this investigation, has issued a regulation requiring all taximeters to carry the official seal of the Scotland Yard, where heretofore the seal of the maker was deemed sufficient. The Scotland Yard's officials, fearing makers could be in

AMERICAN TAXIMETER—HIRED POSITION

league with drivers, decided to remove every vestige of cheating possibilities by substituting its seal for that of the maker.

The Westchester Appliance Co. has completed the manufacture of its first American taximeters, which are to be marketed by the Ajax-Grieb Rubber Co. The instrument is made under the patents of the Taximeter Cab Co. of America, and the first order is for 2,600 instruments designed for a fare charge of 50 cents to the mile. It is reported other orders will be given for instruments designed for a fare of 30 cents for the first half-mile and 10 cents for each additional ¼ mile, which is at present the prevailing rate in New York city. On both styles of instruments there is a charge of 10 cents for each 6 minutes of waiting. The instrument shows the number of trips, the total cash for the day, the total number of miles covered, and each individual fare. Moreover, by a simple device it is arranged that when there is any discussion regarding fare after the occupant leaves the cab, there is no chance for the driver allowing the fare to be running up while the dispute is taking place.

S. Smith & Sons, Ltd., London, England, whose speedometers are well known in this country, have placed on the market the Smith taximeter, which has been used by the London authorities for 3 months, has successfully passed the Scotland Yard test and has received a certificate at Kew. The instrument, of the rectangular type, is 8 inches high, 7 inches wide and 5 inches deep, and is fitted with a dial which shows the fares as regulated by the attachment on the wheel and any extras which may be added during the trip. It is worked on the horo-metric system, that is, actuated by the time or distance, according to the speed at which the vehicle is traveling. It is housed in an aluminum case and weighs about 15 pounds, which is approximately two-thirds of the weight of many other instruments. The operating clock within the instrument is a 2-day movement. When the taximeter is for hire a flag shows at the top, designating that it is not in use. Upon taking up passengers

VACANT
Taximeter & Cab Co. of America
FARE
Minimum Fare for any distance less than one mile 50 cents.
10 cents for each additional 1-5 mile.
Waiting time, 10 cents for each six minutes.
WESTCHESTER APPLIANCE CO.

AMERICAN TAXIMETER—FOR HIRE POSITION

the deflection of the flag causes the initial minimum fare to appear and the mechanism is then set in motion, as the vehicle starts, to record for the distance traveled. The back of the taximeter is furnished with a lock so the driver can look all the dials and mechanism, so he can leave the vehicle without fear of the taximeter being tampered with. There is a round disk with a set knocb for use of the driver, which is set by him to the amount of extras chargeable to the passenger. There is also a counter for the use of the proprietor automatically recording, as it does, the amount actually received for extras by the driver. Another counter is used also for the proprietor, automatically recording, as it does, the amount the driver has received for fares on the horo-kilometric register. The attachment for the wheel is simple, the pulleying system being employed, an arm being actuated once for every turn of the wheel. This pulls the wire inside of a flexible shaft, which moves the driving wheel of the taximeter one tooth. This causes the motion of the instrument to be very slow, and consequently there is little wear on the working parts. This system also does away with the flexible shaft coupling between a toothed pulley or the road wheel of the car and gears in the taximeter. Two illustrations show the instrument in the "fore hire" and "hired" positions.

COMMERCIALETTES

King's County hospital, Brooklyn, has added to its equipment a White steam ambulance fitted on a 30-horsepower chassis, the body work of the ambulance being similar to that furnished to the United States war department.

During the recent snowstorm Gimbel Brothers, of Milwaukee, Wis., found it difficult to make deliveries with horse-drawn vehicles, and successfully pressed into service a Logan delivery wagon, which did the work satisfactorily.

One of the smallest delivery wagons is the Brush package cart, illustrated on these pages and shown in the act of climbing Shelby street hill, Detroit, which is said to be a 10 per cent grade, carrying a load of 210 pounds. The car is a delivery body mounted on the standard Brush runabout chassis.

One of the latest 5-ton electric commercial wagons of the Studebaker company is that of the platform type, with driver's seat mounted high at the front, where it scarcely interferes with the load-carrying platform. The truck is of the under-slung battery type and drives by side chains from two motors.

After an experience of 1 year with the White ambulance, the Philadelphia general hospital has arranged for the delivery of another similar vehicle.

The Auto Transit Co., of Philadelphia, has completed a deal with two local theaters whereby it will run ten special-fare buses from Broad and Spruce to Broad and Race streets, between 7:30 and 8:30 every night, and 1:30 to 2:30 on matinee days.

It is reported steps have been taken at Melrose, Wis., for the organization of a farmers' stock company to establish a freight and passenger car line between Melrose and West Salem.

THE ELMORE TWO-CYCLE THREE-CYLINDER TAXICAB IN CLOSED AND OPEN POSITIONS

MOTORS WITH SOME PECULIAR FEATURES

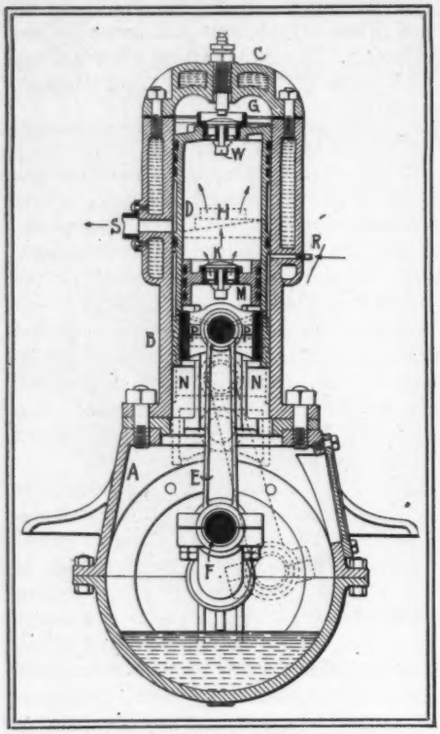
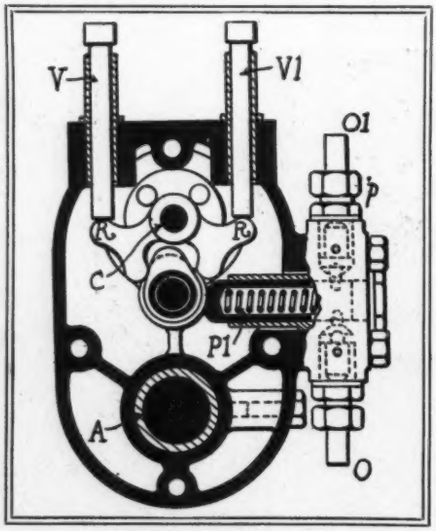


FIG. 1—PICKLES' MOTOR

In these days when inventors are giving so much attention to two-cycle engines, the reader is apt to thrust the majority of them aside, satisfied with a passing glance at each; but when a few patents are taken out by different parties simultaneously and in different countries a review of them will at least give some idea as to the trend of thought in the two cycle problem. Illustrated herewith are motors patented, one in America and the other in France, both of which operate along similar lines in that each uses a hollow piston which resembles a cylinder rather than a piston. The aim of both patentees in using the hollow piston, which is about as long as the cylinder of the motor, is in the hope of getting a definite volume of mixture into the combustion chamber for each explosion. One, the American, accomplishes it in a slightly simpler manner than the other, the Frenchman, but it is doubtful as to which does it the more successfully, as neither of them has been manufactured as yet or put into actual service. The American inventor, Charles Pickles, of St. Louis, Mo., uses an ordinary crankcase A mounted on which is a water-cooled cylinder B with detachable head C, within which reciprocates the long hollow piston D, by means of the connecting rod E, which connects it with the crankshaft F. G marks the space into which the gases are compressed before ignition and the big space H is filled with mixture at atmospheric pressure, which has been drawn from the crankcase through an automatic valve K on the upstroke of the piston D. The reader must not confuse the piece M containing the valve K as a separate piston, because it resembles one with its three compression rings; rather; it is a permanent partition supported from the top of the crankcase through a pair of standards N and technically has been termed the lower cylinder head. The portions P beneath it are the crosshead pieces for attaching the connecting rod E to the sides of the hollow piston D. The exhaust is marked S, the oil orifice R and in another illustration T shows the entrance for the mixture into the crankcase, it being gas-tight as in all two-cycle engines in which the mixture is taken into the combustion chamber by way of the crankcase.

The operation of the motor follows: In figure 1 the piston D is ready to start on the down stroke, the explosion being in the act of taking place. The end of this stroke brings the head of the piston D just below the exhaust opening S, at which time it is above the stationary cylinder head M. Before it has descended to this point it has been compressing the mixture in the space H and just as soon as the pressure of this mixture in H exceeds the exhaust pressure in the cylinder space G then the automatic valve W in the head of the piston D is opened and the mixture rushes into the combustion chamber G, assisting in expelling the exhaust. The valve W will remain open presumably until the bottom of the stroke is reached as illustrated in figure 2. When the piston D starts on the upstroke the valve W immediately closes and as the piston head leaves the lower cylinder head M the space between them increases and the valve K is lifted and mixture from the crankcase flows through it to fill the space H. This continues presumably until the top of the stroke is reached, and a full charge of mixture is held in the space H for the succeeding explosion. This cycle continues, the valves W and K automatically regulating the entrance of mixture.

The French inventor, M. de Costa, shows a two-cylinder vertical two-cycle engine



ASTER VALVE ACTION

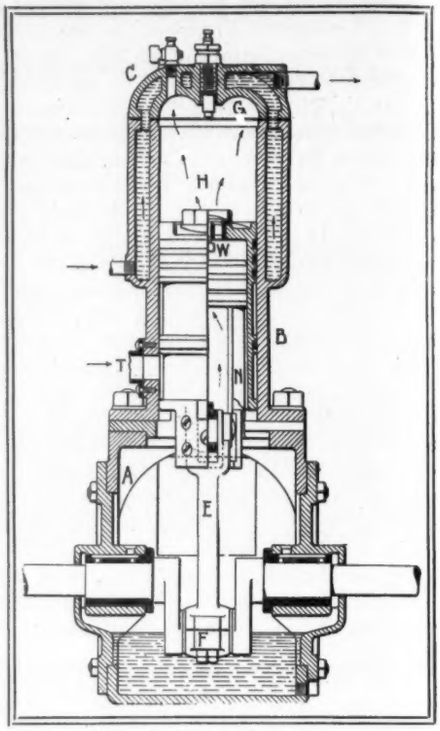
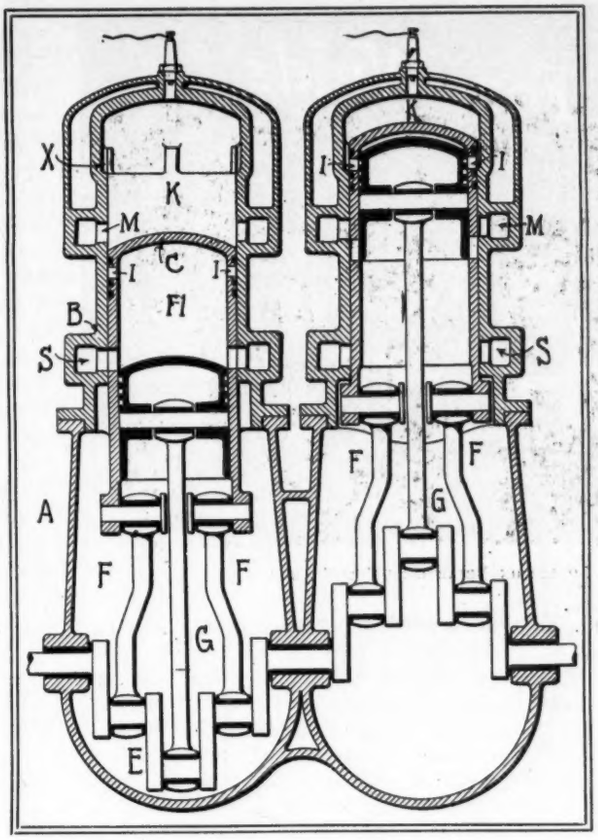


FIG. 2—PICKLES' MOTOR

which has the long hollow reciprocating piston C operating in a regular cylinder B, and also a reciprocating piston, which corresponds with the stationary lower cylinder head M of the Pickles' motor. Both the long piston C and the short one connect with the crankshaft E, the long piston through the two connecting rods F and the short one through the single connecting rod G. As will be noted, the throw on the crankshaft to which the connecting rod G attaches is double that to which the rods F attach, so the little piston has double the movement that the hollow piston C has. This arrangement is looked to for the securing of a full charge on each piston stroke. In this motor, styled for convenience the Costa, the mixture is not brought into the crankcase at all, but, as shown in the left cylinder, is drawn into the space between the two pistons. Later when the piston C rises to the position shown in the right cylinder it escapes through the opening I into the combustion chamber K by way of the expansion X in the cylinder. Giving the small piston a double stroke moves it up well, so that at the top of the stroke there is but little space between it and the top of the piston C, as illustrated in the right cylinder. On the down or explosion stroke the explosion is confined to the space K above the piston C, and while piston C is forced downwards, the small piston, going down twice as fast, runs away from it, creating a partial vacuum between them until the intake ports S are reached, when the mixture rushes in to fill the space F1, which separates them. Thus is a charge drawn in: On the upstroke it is com-

pressed between the pistons, and when the pressure is great is bypassed to above the top of piston C, ready to be exploded. Thus does Inventor Costa secure a definite mixture supply for each cylinder; exhausts in the ordinary way through the ports M except in that the incoming gases do not in any way assist the exhausting, and it is questionable to what extent the exhausting or scavenging is carried out. From the brief descriptions obtainable the inventor appears to accomplish the work of getting a definite mixture in on each stroke better than he secures a good exhaust. It does not appear how the compression is retained until after the piston has descended past chamber K, after the piston has reached the expansion X, through which the mixture is bypassed into the compression chamber. The problem of lubrication does not appear to have received any attention in the de Costa motor, yet it is most apparent that with two pistons working in each cylinder an extra amount of lubrication will be needed. The lower piston—the one shown in dark lines—is far removed from the waterjacket spaces and consequently much extra oil must be needed between it and the inside of the long piston C. There is no reason why suitable oiling means cannot be secured.

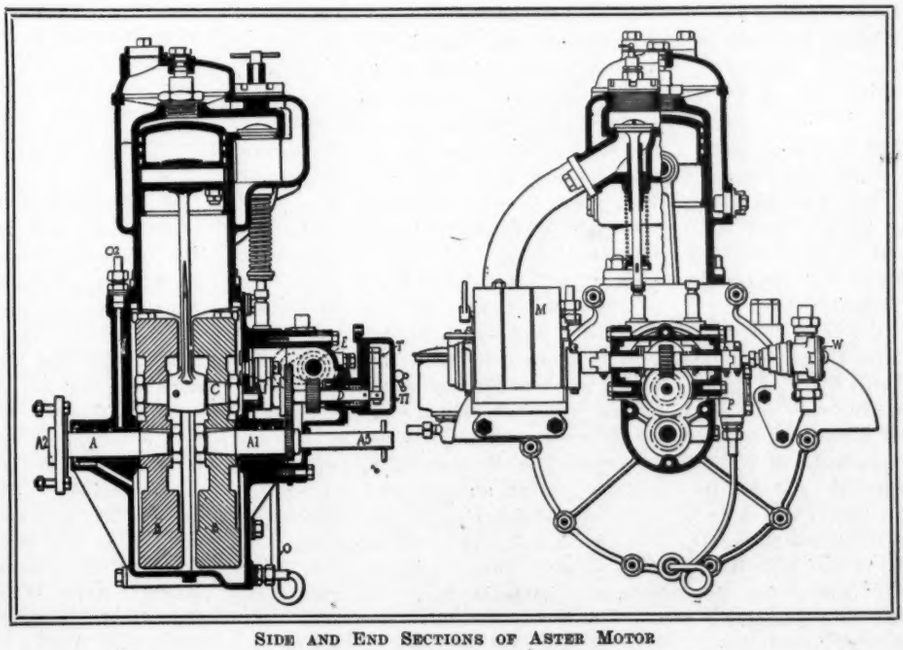


SECTIONS OF DE COSTA TWO-CYCLE MOTOR

MONO-CYLINDER ASTER MOTOR

The single-cylinder, or mono-cylinder, motor car engine, perhaps the most unpopular of all present styles, has in some parts of the world a most devoted following and which has doubtless been responsible for the pronounced improvement made in this type of motor within the past couple of years. The Aster motors, made by the Aster Society, Paris, Fr., have included the single-cylinder style in their ranks for several seasons and this year an improved single-cylinder model has been brought out. This latest product, three sections of which appear, is a carefully made power plant and is claimed to be so well balanced as to practically eliminate vibration. Then, too, it is well fitted with its high-tension magneto, approved lubrication system, thermo syphon, or pump water circulation, and compression reliefs for starting. Its compactness is a virtue and is largely brought about by the use of a transverse shaft driven from the camshaft and on which are the magneto M and water pump W.

The motor is without a crankshaft in the regular sense of the term, the substitute being a pair of bearingshafts A and A1 which are taper fits in the two-part encased flywheel B, between which parts is left sufficient room for the connecting rod to work. The crankpin C to which the connecting rod attaches is a taper fit into the flywheel parts also. The connection with the transmission is at the end A2 where a flywheel can be attached if needed; at the opposite end is an extension A3 for cranking. The camshaft D is spur-driven off the crankshaft and carries two cams which act against a pair of three-arm rockers R that bear against the intake and exhaust valve lifters V and V1. The three-arm rockers facilitate the valve action in making it possible to open both valves from one shaft which parellels the crankshaft instead of lying crosswise of it. The illustration shows one of the cams between the pair of rockers and the other cam contour is indicated by the dotted line. This illustration further shows how the oil pump is a plunger piston P1 pushed outward by an extra cam on the camshaft and returned when the cam is past by a coiled spring. This pump draws the oil through pipe O from the crankcase and delivers it through lead O1 to a gravity tank, whence it later enters one of the main bearings by a pipe O2. The oil pump part P is but a couple of check valves acting in conjunction with the plunger P1. On the crossshaft E at one end is the high-tension magneto M, at the other end a water pump W is attached when requested, but ordinarily the cooling is preferred by thermosyphon circulation; and on the front end of the camshaft D is the timer T with its cover part T1. The different illustrations show how liberally the cylinder head is waterjacketed as is the chamber for containing the valves. The crankcase is a two-part casting with a vertical split not in the plane of the crank and camshafts; the cylinder is an integral one-piece casting; and the piston and connecting rods are conventional.



SIDE AND END SECTIONS OF ASTER MOTOR

The chief value and claim made for the motor is its freedom from vibration due to the weights forming the throws of the crankshaft as well as the flywheel carried, and it is claimed a speed of from 250 to 1,800 revolutions per minute is possible by the throttle and spark variations. The carbureter is an automatic type made entirely without springs, and one designed for use in widely varying climates visted by the users of cars.

MAJA, SIMPLEX AND LOZIER ON BRIARCLIFF CUP COURSE

After State Aid—State aid to the towns of Wisconsin for the building of roads is the aim that Wisconsin motorists are striving to bring about. At the next general election the voters of the state will be called upon to vote on the question of amending section 10 of article 8 of the state constitution so state aid will be accomplished. Motorists and others interested in the securing of the best possible roads are confident the amendment will be passed.

Against Tire Chains—Despite the strong protest put up by the Philadelphia clubs at its introduction, the resolution prohibiting the use of the park roads by motor cars equipped with tire chains was last week unanimously adopted by the commissioners of Fairmount park. A concession was made to main line residents and tourists bound northwestward by excepting Belmont avenue. As this much-traveled route cannot be reached very handily from the northern part of the city, except by way of Girard and Parkside avenues, which are paved with Belgian block, the commission, on motion of Sidney W. Keith, decided to repave the north half of those streets with asphalt.

Two Flyers Matched—Arrangements have been made for a match race between F. E. Stanley's steam flyer that at present holds the Dewar trophy, and the twelve-cylinder Maxwell racer, built by the Maxwell-Briscoe Motor Co. The pair will come together at Atlantic City, Cape May, or at Ormond. It was agreed that the race be held for the Dewar trophy, over a course to be selected by W. J. Morgan, representing the trustees of the trophy. He will suggest a suitable course, subject to the final acceptance of F. E. Stanley and J. D. Maxwell, and H. L. Bowden, the Boston member of the A. A. A. racing board. After the selection of the course the race is to be held in 2 months. The factor of safety for the drivers of the cars came in for considerable discussion. It was agreed that two cars starting together would offer unlimited chances for an accident, and Mr. Stanley volunteered to open negotiations with Sir Thomas Dewar, through Mr. Morgan, with a view of obtaining consent to change the deed of gift so as to permit the disposition of the cup by time trials instead of requiring the cars to start together. The contest is open to others, and it is understood Louis Ross with a steam car of his own construction may be in.

English Reliability Trial—Entries for the international reliability trial which starts on Thursday, June 11, are already pouring in. Among them are two American White steam cars, which have been entered by Frederick Coleman. The other entries are: Eight-horsepower de Dion, 12-14-horsepower de Dion, 10-12-horsepower, 15-horsepower and 30-horsepower Coventry Humbers, 20-horsepower Beeston Humber, 40-horsepower six-cylinder Napier, 40-50-horsepower six-cylinder Napier, two 40-50-horsepower Rolls-Royce.

Elmore to the Rescue—A 1907 Elmore is being used as the principal mode of transportation of East Toledo residents to and from East Toledo and Toledo, O., at this time. During the flood and high water an enormous steel freighter was carried down the river with such force as to knock out a span of the Cherry street bridge, the only one connecting Toledo with East Toledo, a town of 50,000 inhabitants—that is, the only bridge that could support street cars and which is located in an accessible section of the town. When this bridge was put out of commission it necessitated the use of the Fassett street bridge—located more than a mile from the centers of both the east and the west sides. Realizing what an enormous amount of traffic would be shunted to the Fassett street bridge, Albert L. Williams, the owner of a 1907 Elmore, with a keen eye to business, immediately transformed his touring car into a public conveyance. Mr. Williams has not quite paid for his car out of his stunt as yet, but if it takes them more than the allotted 2 weeks to repair the bridge the chances are his Elmore will not have cost him much.

New York's Carnival Week—The week of April 6 will be made a gala occasion by the New York tradesmen, who have made their arrangements for a gigantic parade and a hill-climb. The latter will be held on Fort George hill.

McDuffee Hill-Climbing—J. H. McDuffee, formerly of Chicago and now representing the Kisselkar in the far west, is doing considerable driving these days, one of his stunts being the climbing of a hill near Las Vegas, N. M., which drops 2,000 feet in 3 miles and which takes him from 18 to 20 minutes to climb in a Kisselkar.

Glidden Heard From—C. J. Glidden, the cable says, is the first to drive a motor car in Jerusalem, the dispatch stating that "the historic Holy City is stirred by the appearance of the first motor car ever seen in the community. It was driven into the town by Charles J. Glidden of Boston, who came from Haifa, Syria, accompanied by Mrs. Glidden."

Chicago's Carnival—The Chicago Automobile Trade Association has its plans well in hand for the spring carnival which will open March 28 and last to April 4. On the opening night there will be a monster illuminated parade taking in all sides of the city and in which three prizes will be awarded for the best decorated cars. Tuesday night there will be a gymkana on the row, and on Friday night there probably will be a tug of war between two motor trucks. The committee is arranging other features which it will announce later.

Diamonds at Savannah—Harry G. Smith, of the Cleveland branch of the Diamond Rubber Co., who had charge of the Diamond supply car in the Glidden tour last summer, is captain of the Diamond tire camp at Savannah. Twelve of the seventeen cars entered are equipped with Diamond tires, and all but two also use the Diamond demountable rim. The cars using the Diamond product include the Appersons, Stearns, Thomas-Detroits, Thomas Flyer, Lozier, Pennsylvania and American.

On Briarcliff Course—The headquarters of Michener and Mulford, who will pilot the two Lozier cars in the Briarcliff race, have been established on the Briarcliff Manor property, a quarter of a mile south of the start. The building is 100 feet long by 25 feet wide, with cement floor, and well lighted, and with an entrance opening directly on the state road. In this building the cars will be stabled for 30 days prior to the race, while the crews are in training. The headquarters of the drivers and mechanics during this time will be at the Briarcliff stores, immediately at the entrance to the Briarcliff Manor. Harry Michener made a trip over the circuit recently, acquainting himself

with the course, and he agrees with Mulford in his estimate that the maximum speed of the winner of the race will not exceed 45 miles per hour.

Against Women Drivers—Mayor Markbreit of Cincinnati has asked the city council to pass an ordinance, one of the features of which is a clause forbidding women driving motor cars.

After State Boulevard—At the last session of the Colorado legislature $15,000 was apropriated as a nucleus of a fund to be expended in the construction of a state boulevard to extend from Trinidad, on the southern boundary, to the north boundary, a short distance beyond Fort Collins. The counties through which the road will be built are, under the enactment, to pay a proportionate share of the cost. The principal towns along the line are Trinidad, Walsenburg, Pueblo, Colorado Springs, Denver, Boulder, Longmont, Loveland and Fort Collins. Last week there was a conference between Governor Buchtel, Mayor Speer of Denver, representatives of the Denver real estate exchange, the state engineer and the state auditor, to formulate plans for the beginning of the work, which, under law is to be executed by state convicts. It was decided to send the state engineer to meet the commissioners of the various counties through which the road will be built and arrange matters according to their desires, so work can be commenced on the proposed boulevard next month if possible.

Taxation in England—The subject of taxation is exercising the minds of motorists in England. It is practically certain that motor cars, now taxed proportionately far above any other vehicle, will be even more severely taxed in the forthcoming budget. Motorists do not object to the tax on one condition, and that is that the government shall appoint a central authority to supervise the upkeep of the roads and pay for the upkeep. But the chancellor of the exchequer has to find money to raise old-age pensions, and he looks to motor cars to supply a goodly percentage of this. Hence he will make no grant for the inevitable tax to maintain roads, and motorists are up in arms against him. A petition is being widely signed by motorists in England, craving for justice.

Favor a State Road—Members of the Automobile Club of Maryland are in favor of the construction of a state road connecting Baltimore with Annapolis, the state capital. With this purpose in view, they went before the legislature and urged the passage of a bill for this purpose, which has just appeared in the general assembly. The bill proposes that the road shall begin at Brooklyn, at the southern end of Light street bridge, thence along Light street road as now constructed to Glenburnie; thence by the most direct and practicable routes, which shall border upon the state rifle range, to Elvaton. Passing the range the road is to go by the Jumper hill and Severn river roads to Boone's and thence to Annapolis. The motorists asked that $20,000 be given to start the work and that similar sums be appropriated in 1909 and 1910 to complete it. The present routes from Baltimore to Annapolis, they claim, are impassible at this time of the year.

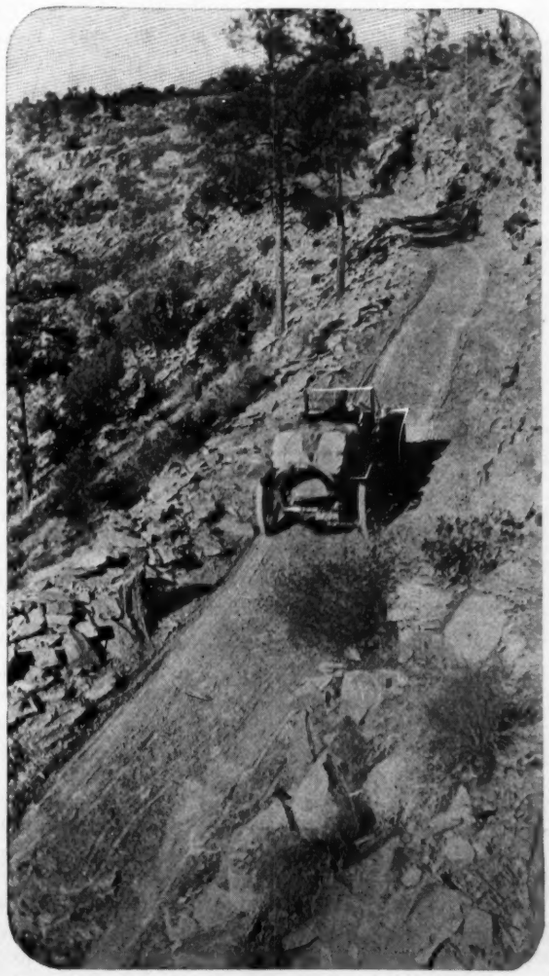
Driver Commits Suicide—Joseph Collomb, a prominent French driver and a competitor in the leading European contests, committed suicide recently at Lyons, France, because of financial reverses, it is said. Collomb was 36 years of age and in his younger days was a crack bicycle racer. His greatest motoring feat was breaking the 5 kilometer record, which he cut to 2 minutes ⅘ second in a 120-horsepower Mors.

Milwaukee's Latest—Milwaukee motorists are enthusiastic over the plans of the Milwaukee county park commission, which is planning to make Milwaukee county a succession of parks and boulevards. Plans are under way for the macadamizing of all of the country roads and for the establishing of foot paths along the sides and for the setting out of shade trees along the main roads. Leading owners in the county are endeavoring to win the support of the public in favor of the enterprise, then the county board will be asked for the necessary money to go ahead with the improvements. One highway, following the course of the Milwaukee and encircling the city, already has been mapped out by the commission. Work is now progressing on the new Lake Shore drive, which bids fair to rival the famous Sheridan drive in Chicago.

Prominent Motorist Dead—Robert M. Pratt, secretary of the Worcester Automobile Club and a veteran newspaper man, died at his home in Worcester, Mass., last Friday after 8 weeks' suffering from uremia, although there were other complications. Mr. Pratt was at one time prominent in military affairs in Massachusetts. When stricken with what proved to be a fatal illness he was hard at work planning the climb to be held on Dead Horse hill this year, as well as preparing for fights against adverse motoring legislation.

Home-Made Chain Grip—A driver of a Hartford light commercial car has hit upon a novel and efficient form of chain grip. The car in question is a single-cylinder air-cooled Knox and the tires are of solid rubber. Holes were drilled at frequent intervals through the wood part of the wheel close to the metal tire rim. These holes were bushed with brass tubes, so there was no possibility of enlargement through strain. A steel bolt the width of the rim then was pushed through the bushed hole and each end of a section of heavy galvanized iron chain was secured to a corresponding end of the bolt. The result, a series of independent units, easily repaired or replaced, is most satisfactory. The idea was suggested to the driver by reason of the frequent breakage of ordinary chain grips. The grips are used only when the roads are slippery and the snow is deep. The cost, so it is claimed, is very slight and repairs or replacements can be made in a moment.

O. K. Bridge Scheme—Maryland motorists are interested in the proposition of the Harford county commissioners for the establishment of a bridge for vehicles over the Susquehanna river, from Havre de Grace to Perryville. This would give a connection for interchange of interests between Harford and Cecil counties and would be exceedingly useful in traveling in that section of the country. Harford has a splendid stretch of 16 miles of fine road, and the only reason there is not more through travel is because of the delay in crossing the Susquehanna. This inconvenience has been doubly felt since the burning of the Conowingo bridge, which makes continuous travel impossible for motorists unless they have their cars carried across the river at this point on trains.



KISSELKAR CLIMBING NEW MEXICAN HILL

Legal Lights and Side Lights

TOLEDO'S TRAFFIC RULES

The rapidly increasing number of motor cars in use in Toledo, O., has resulted in bringing out a new traffic ordinance regulating the use of the streets and designed to reduce to a minimum the danger arising from congested streets. The ordinance, which was passed by the council last week and will be operative within a few days, is extremely simple, and is but an application of the old American rule of the road—keep to the right. Under present conditions, when vehicles obey no rule of the road except that they pass each other upon the right side when they feel like it, there is constant confusion, small collisions and great loss of time in the crowded streets. As the city grows it becomes more and more difficult to do business unless some order and harmony prevails among the drivers of vehicles. This is sought to be accomplished by a complete code of rules prescribed, of which the following are leading regulations:

All vehicles shall keep to the right.

Vehicles meeting shall pass each other on the right.

Vehicles moving slowly must keep near the right curb, allowing those moving more rapidly to keep the center of the street.

Vehicles at street intersections, turning into another street at the right, shall keep to the right.

Vehicles at street intersections, turning into another street at the left, shall continue to the opposite side of the lateral street before changing direction to the left.

Vehicles at all times shall keep the right hand to the curb. When desiring to stop on the left side of the street make a complete circle, bringing the right side of the vehicle to the curb.

Vehicles shall not stop on any street crossing.

Vehicles shall stop or move on signal from a police officer.

The apparatus and vehicles of fire, police and hospital departments, when sounding gongs, shall have the right of way through all streets and alleys.

NEW YORK'S IDEA OF LAW

The New York State Automobile Association, through President Quayle, announces that the new bill for the regulation and registration of motor cars in the state of New York conforms as nearly as is possible to the uniform motor bill as suggested by the American Automobile Association, and which is now being considered by the legislatures of Ohio and Massachusetts. This is the first step toward establishing uniform legislation. The marked differences between this bill and the present motor vehicle law are as follows:

First—The bill provides for the annual registration of motor vehicles, and for the payment of fees sufficiently large in amount to be equivalent to taxation of those vehicles by the state. It is anticipated that the revenue derived from this taxation will return to the state, for the first year, from $250,000 to $300,000, with a substantial increase each year thereafter, as motor vehicles multiply. All of the revenue so obtained shall be paid to the special fund for the maintenance of state highways. The fees to be paid are to be based upon weight, and should vary from $2 for the lightest vehicle to not more than $15 for the 6,00-pound cars.

Second—A positively thorough method of identification of motor vehicles when on the public highways is provided for in the provision that all vehicles shall hereafter carry numbers front and rear, the said numbers to be changed in color each year, and to be issued and provided by the secretary of state. Severe penalties are imposed for violations of this provision.

Third—In addition to the usual provisions as to lamps, horns, etc., there is an entirely new provision prohibiting the use of non-skidding tire devices, except when the highway is covered with ice or snow, or in an otherwise dangerous condition.

Fourth—The usual exemption for non-resident owners. The same prohibition against local ordinances affecting motor cars, as is in the present law, together with a brief definition of permissive speed, which corresponds to that recognized in foreign countries, and very much like the provision of the Connecticut law, which is in operation today.

Fifth—To assist local magistrates in enforcing the law as to the second and third offences, provision is made for the transmission of records of convictions, under the law, to the secretary of state, who, in turn, is obliged to notify all the county clerks of the state of all speed violations. Along the same line there is a new provision requiring the secretary of state to file with each county clerk a list of registered motor vehicle owners and registered chauffeurs, and to file each 30 days a supplemental list, showing registrations to date, to the end that local authorities may ascertain the identity of persons who violate the law and do injury to others while operating motor vehicles.

Sixth—Beside the local penalties for violations, which are somewhat more severe than those at present in force, it will be possible to annul the certificate of registration of any vehicle that uses a fictitious number, and to suspend, for a period of time, the right of any chauffeur to operate any motor vehicle in case of convictions. In addition there is a provision making it a misdemeanor for any person to tamper with or use a motor vehicle without the consent of its owner. This provision will be much appreciated.

MARYLAND'S LATEST IDEA

Delegate Kuebel, of Baltimore, introduced a bill in the Maryland house of delegates providing for the abolishment of all motor cars in the state except those run by electricity. This is specified by the paragraph in the bill which says it shall be unlawful for anyone to own a motor car, motor cycle or other traction vehicle which emits nauseous or obnoxious gases. Inasmuch as the gasoline-driven vehicles emit such gases this would put them out of the running in Maryland. The bill also limits the speed within the city limits to 6 miles an hour and in the counties to 20 miles an hour. It also provides that no car shall have more than seven whistles and gas lamps combined. It hardly is to be expected the legislature will waste much time on this measure.

MUST PAY FOR SHIELD

John N. Stuart, of Baltimore, won a suit of $50 against the Baltimore and Frederick Road Turnpike Co. for the breaking of a wind shield by the dropping of a toll gate upon his car as it was passing the Frederick road October 24. The keeper of the gate let it up for the car to pass as the vehicle came down the road, expecting the occupants to stop and pay the toll. The toll, however, had been paid on the morning trip and the car failed to stop, running against the toll gate. The jury brought in a verdict favorable to Mr. Stuart after an hour's deliberation.

BEWARE THE MAIL SACK

If you happen to be the possessor of a United States mail sack and are seized with the idea, as was Herbert G. Porter, that it would be an ideal means of transporting some of your belongings or someone else's—beware. You're liable to get arrested if you so utilize it and are caught, and it's quite likely you will be if a postmaster happened to be a bug on motor cars as is Postmaster James W. Hunt, of Worcester, Mass. Herbert Porter thought it would be fine to carry around confetti in a motor car and dump it along the route of the Bay State Automobile Association's endurance run. It was fine. Now he has been arrested and arraigned before Comissioner Haynes because he used a regulation government mail bag for that purpose. He will be given a further hearing. Postoffice inspectors say a vigorous prosecution of the case will be made to show there is a law existing to prevent the use of government property for private purposes. Postmaster Hunt was the one who discovered the mail bags when the confetti car reached Worcester.

TURNPIKE COMPANY LOSES

The Laurel Run Turnpike Co., which owns the boulevard between Wilkes-Barre and Bear Creek, Pa., has prohibited its use by motorists on the grounds that motor vehicles are not available for the road; that the road was not built for their use, and that as a motor car is a conveyance not generally used it is not to be classed as a vehicle, like a carriage drawn by horses. These pleas were advanced by the turnpike company as a defense in the suit which has been brought by W. W. Scranton, of Scranton, to compel the company to open the road to motor cars. Judge Lynch, of Wilkes-Barre, last Friday held that a motor car is to be considered quite as much of a vehicle as a carriage drawn by horses, and ordered the company's averments along these lines stricken out.

FREAK BILL INTRODUCED

The freak legislator has made his appearance in Boston at the state capitol with a bill that is entitled "To Prevent Accidents." The first section provides a fine of $1,000 and 1 year's imprisonment for any motorist who may injure a person or corporation; the second $5,000 and 3 years in prison for gross negligence, and where a life has been lost $10,000 and 10 years. Another queer bill provides that motorists must equip their machines with any device now or hereafter invented that will give a continuous warning of the approach of the motor car. Just what the bill expects to have put on cars is an enigma to the Massachusetts motorists.

Brief Business Announcements

New York—A. G. Southworth, who is the local agent for the Pope-Hartford, has added the Matheson to his list.

Lansing, Mich.—The Rainier Motor Car Co., of New York and Saginaw, has been incorporated with a capital stock of $1,000,000.

Denver, Col.—A permit has been issued for the enlargement of the garage on Court place. Two additional stories are to be added to the building.

Windsor, Ont.—The first motor car to be built in this city has just been completed at the factory of the Windsor General Machine Works, of 149 East Wyandotte street.

Milwaukee, Wis.—The Commercial Automobile Co. has been organized in Milwaukee with a capitalization of $15,000 by O. A. Eskuchie, Mitchell Mackie and H. W. Eskuchie.

Albany, N. Y.—The Franco-American Taximeter Co. has increased its capital stock from $500,000 to $1,050,000. Alexander & Colby, of 120 Broadway, New York city, are named as the attorneys.

South Orange, N. J.—The old Empire hall, on South Orange avenue, used as a garage, was burned out last wek. The fire caused a loss of more than $30,000. Two of the cars stored in the garage were destroyed.

Milwaukee, Wis.—Bids are being received by Magnus Holberg for the construction of a one-story concrete block to be used as a motor car repair shop by Wuld Brothers of Milwaukee, the new structure to be erected on National avenue.

Monroe, Wis.—The Miller Mfg. Co. has been organized for the manufacture of carriages and vehicles and for the maintenance of a large motor garage. The company has been capitalized at $30,000 and work will soon be begun on the new structure that is to be erected in the spring.

Cleveland, O.—The Wolf Motor Car Co. has succeeded the Leonard Motor Car Co. and will continue to act as agent for the Jackson. Fred Wolf, of Elyria, is to act as general manager, H. M. Leonard is to continue as sales manager, while B. S. Troxel has been elected president. The capital stock of the company has been increased.

New York—Temporary receivers have been appointed for the Mercedes Import Co., a concern which was backed by Charles W. Morse. John S. Primrose, Henry S. Colwell and Eugene L. Bushe have been appointed temporary receivers and Louis D. Doyle referee. The application for the appointment of the receivers was made by the officials of the company in proceedings for voluntary dissolution of the corporation. The order to show cause is returnable on June 1.

Philadelphia, Pa.—Henry A. Rowan, Jr., & Co., of Sansom street, has been appointed local agent for the Allen-Kingston.

New York—The Colt Runabout Co., of 1876 Broadway, has filed articles of bankruptcy, with liabilities of $14,213 and assets of $1,875.

New York—Plans have been filed with the building department for alterations to the garage at 159 West One Hundred and Twentieth street by the installing of a mezzanine floor.

Newark, N. J.—John Price is shortly to open a new garage on Campbell street. In addition to a general garage business he will make a specialty of repairing and renting machines.

Hoosick Falls, N. Y.—The Hoosick Falls Auto Co. has leased the property at Church and Elm streets and will commence the erection of a garage. It expects to have the building completed by April 1.

Canastota, N. Y.—The Two-Spot Mfg. Co. is about to put a new spark plug on the market to be known as the Two-Spot, the name being derived from its peculiar property of making two sparks at two well-separated points.

Buffalo, N. Y.—Homer E. Dudley has been named trustee in bankruptcy for the O. K. Machine Works, of 887 Main street. The company has a large machine shop and garage business. Recently the concern made an assignment for the benefit of creditors, and Louis Braunlein was appointed receiver. He had considerable trouble, as the lawyers could not agree on a settlement, so finally Mr. Dudley was appointed trustee.

Buffalo, N. Y.—James B. Koen Co., capital stock $10,000, to engage in the manufacture of motor cars and other vehicles. Incorporators, James R. Koen, John VanArsdalo and James Griffin, all of Buffalo.

Camden, N. J.—Rittenhouse garage, capital stock, $10,000, to repair and store motor cars. Incorporators, Charles Fraser, W. H. and J. L. Rodgers.

New York—Jones Taximeter Co., capital stock $10,000, to manufacture motor accessories, machinery, engines, etc., and also operate cars. Incorporators, Joseph W. Jones, Raymond M. Owen, both of New York, and Roy A. Rainey, of Lakewood, N. J.

New York—Progress Motor Vehicle Co., capital stock, $50,000, to maintain, deal in and operate motor vehicles of all kinds. Incorporators, F. J. Hogan, M. Schlesinger, and L. Divisio.

New York—Metropolitan Taxicab and Auto Service Co., of Manhattan, capital stock $100,000, to deal in motor cars, etc., and manufacture vehicles of all kinds. Incorporators, J. W. Cummin, L. G. Hall and E. True, all of New York city.

Harrison, N. J.—T. J. Butler is erecting a two-story brick garage at 435 Harrison street. He will make a specialty of repair work.

Boston, Mass.—Walter H. Woods has been appointed local agent for the Palmer & Singer, and will open his salesrooms at 173 Huntington avenue.

New York—The Hotchkiss Import Co. has taken over the representation of Hotchkiss & Co., of Paris, and will handle their business exclusively.

Milwaukee, Wis.—The Petrol Motor Car Co. has ben incorporated in Milwaukee with a capitalization of $5,000 by M. S. Rausch, J. D. Shaw and E. J. Evans.

Albany, N. Y.—The Stepney Spare Wheel Agency, of New York city, has been incorporated with a capital stock of $10,000, and will engage in the manufacture of motor wheels.

Milwaukee, Wis.—The Power Vehicle Co. has been organized in Milwaukee with a capitalization of $25,000. The incorporators are C. L. Stephenson, J. A. Salentine and T. C. Clarke.

Newark, N. J.—In the future Russell E. Gillam will be manager of the sundry department of the Motor Car Supply Co., of New Jersey. N. A. Maul, formerly of the Greene Motor Co., will be chief salesman.

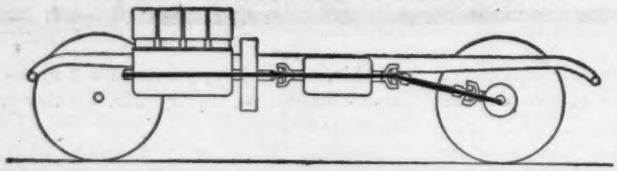
Ilion, N. Y.—A new company, to be known as the Empire State Auto List Co., is in process of organization here. The object of the new concern is to supply all dealers and accessory manufacturers with the names of all new purchasers of cars.

Harrisburg, Pa.—Application will shortly be made for a charter for the Harrisburg Taxicab and Baggage Co., which is to be controlled by local interests. The company will use the American Mors cabs. For handling the baggage, a Knox truck will be utilized.

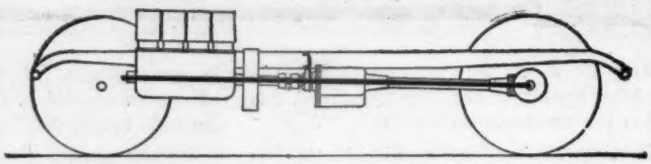
Columbus, O.—A new company has been organized, to be known as the R. J. Hixon & Co., and will take over the business of the Hixon-Whitmer Automobile Co., located on East Fifth avenue. The members of the new concern are R. J. Hixon, who was connected with the old company, and Fred E. Love.

La Crosse, Wis.—Steps have been taken for the organization of a company for the establishment of a freight and passenger motor service between Melrose and West Salem, via Burr Oak and Mindoro. The company will have a capital stock of $10,000, and will utilize two large modern cars. The freight car will make one round trip per day, and the passenger two.

The Wrong Way
Note Deflection at Universal Joint



The Rambler Way
No Power Lost in Transmission



Rambler Straight Line Drive

Of the new ideas in automobile construction none are of greater value than the straight line drive system as applied to the 1908 Ramblers.

It is well known that no matter how good or carefully made the universal joint, there is an inevitable loss of power and great wear due to deviation from a straight line in the power transmitting system and the loss increases with the square of deflection.

With the Rambler straight line drive there is no deflection, hence no loss and the full power of the motor is delivered to the driving axle.

This is but one of many valuable features; our catalog tells of others of equal value; write for it today.

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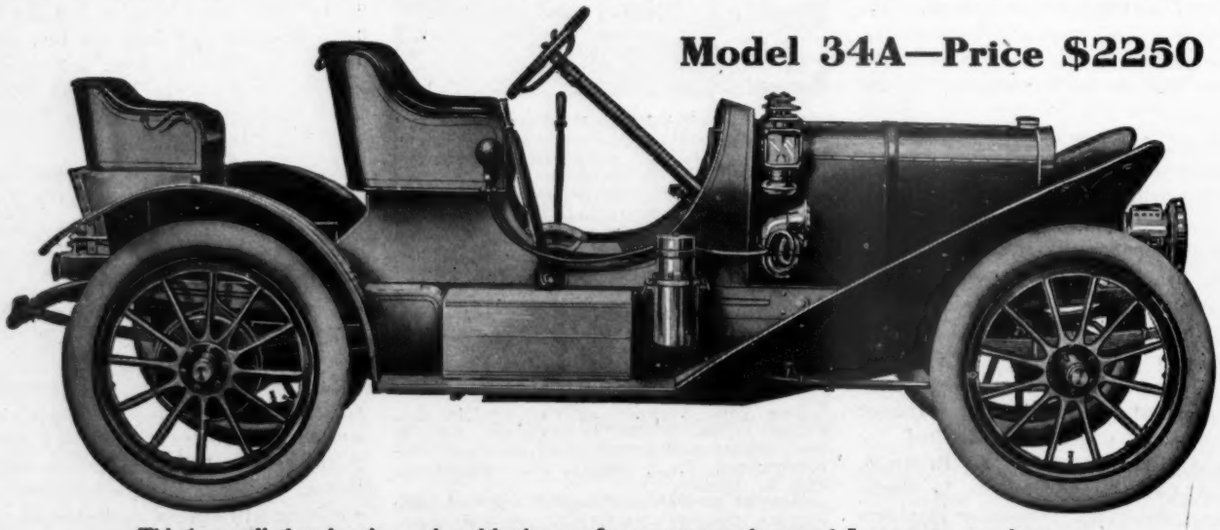
Model 34A—Price $2250



This four cylinder chassis, equipped both as a 3-passenger roadster and 5-passenger touring car Price of each style $2,250. The Rambler Utility Car with double opposed motor, $1,400